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ABSTRACT

The 250 new and/or updated abstracts of dissertations in this latest supplement are listed alphabetically by author and date and by author under single, double, and triple descriptors and are presented in a loose leaf format. This document and the previous supplements (ED 037 583, ED 049 391, ED 062 560, and ED 076 846) are designed to provide teachers, students, and administrators in industrial arts, trade and industrial education, and technical education with a single source of information regarding doctoral research completed from 1930 to the present. (SA)

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1. New abstracts to add to your existing compilation.
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3. Alphabetical listing of authors for all abstracts found in the compilation.
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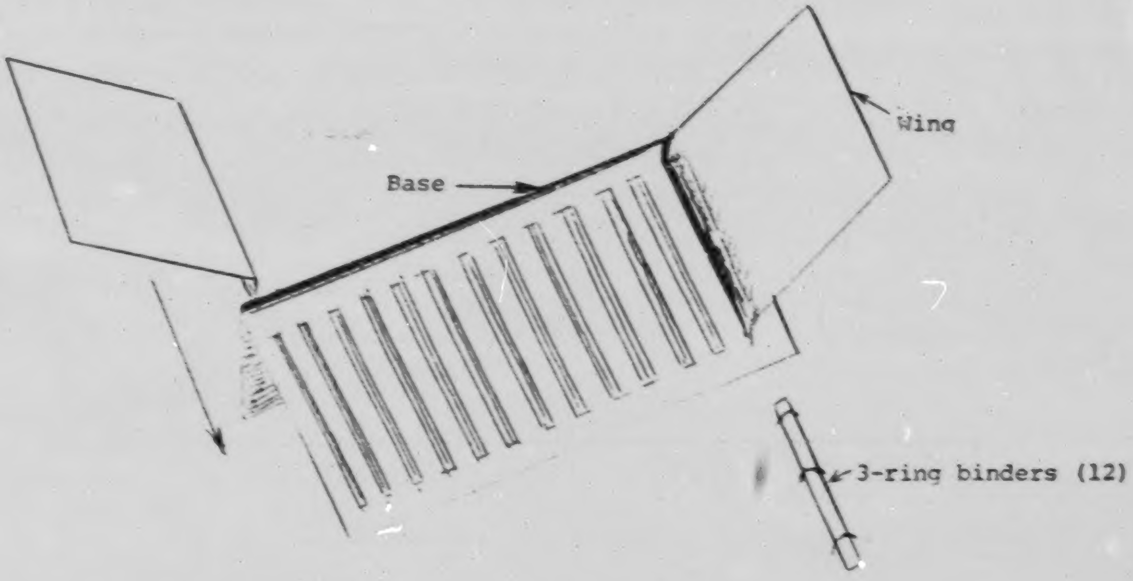

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LANGFORD JR, HARRY E	1973
LANGFORD, AL G.	1969
LANMAN, RICHARD W.	1953
LAPIDUS, GEORGE	1954
LAPPIN, ALVIN R.	1958
LARSON, CURTIS G.	1971
LARSON, DELMAR L.	1964
LARSON, IRVING W.	1969
LARSON, MILTON E.	1965
LARSON, RAYMOND H.	1951
LARUE, JAMES P.	1968
LATHROP, ROBERT C.	1969
LAUBENTHAL, CRAIG D.	1969
LAUDA, DONALD P.	1966
LAWS, NORMAN G.	1966
LAWSON, TOM E	1973
LE BLANC, DARRELL R.	1971
LEAN, ARTHUR E.	1948
LEASE, ALFRED A.	1964
LEAVITT, MAX V	1972
LEAVITT, MURRAY P.	1970
LEAVITT, WILLIAM C.	1969
LEE, MOON Y	1972
LEE, RAPHEL D C	1972
LEFFARD, WARREN L.	1968
LEHN, LLOYD L.	1967
LEMASTER, LELAN K.	1961
LEMLEY, JOE W.	1970
LEMONS, CLIFTON D.	1965
LENTO, ROBERT	1971
LEONARD, REGIS L.	1950
LESTER, SEELIG L.	1944
LEVANDE, JAMES S	1972
LEVENSON, WILLIAM B.	1937
LEWCHUK, LESLIE L	1972
LEWIS, MYRON E.	1970
LICHTBLAU, LEONARD R	1958
LIEN, DAVID A.	1971
LIGHT, JOHN J	1973
LIGHT, KENNETH F.	1967
LINDAHL, DONALD G.	1971
LINDAHL, LAWRENCE G.	1944
LINDAU, ORA F.	1968
LINDBECK, JOHN R.	1958
LINDEMEYER, RAY S.	1954
LINE, JOHN D.	1971
LINHARDT, RICHARD E.	1971
LINKSZ, JAMES J.	1971
LINNICK, IDA	1949
LINTON, JOHN A.	1951
LITTLE, RICHARD L.	1968
LITTRELL, JOSEPH J.	1958
LJOSTAD, RODNEY A.	1965
LLOYD, CLIFFORD J.	1968
LOATS, HENRY A.	1950
LOCKE, LEWIS A.	1969
LOCKETTE, RUTHERFORD	1956
LOEPP, FRANZIE L.	1970
LOGUE, JAY L.	1959
LONDON, HOYT H.	1934
LONG, GILBERT A.	1970
LOOSLE, DARRELL K.	1967
LOPEZ, DANIEL C.	19
LOPEZ, GUILLERMO	1970
LOUGHLIN, RICHARD L.	1948
LOVELESS JR, SIDNEY	1969
LOVELESS, AUSTIN G.	1962
LOW, FRED G.	1963
LOWENSTEIN, NORMAN	1955
LOWMAN, CLARENCE L.	1967
LUCE, LAWRENCE W.	1957
LUCK, WILLIAM E.	1966
LUCY, JOHN H.	1971
LUDINGTON, JOHN R.	1940
LUDLOW, GERALD C	1973
LUETKEMEYER, JOSEPH	1961
LUFF, ANDREW C.	1955
LUNDY, LYNDALL L.	1968
LUTZ, RONALD J.	1969
LUX, DONALD G.	1955
LUY, JACK A.	1964
LYBARGER, ALVIN E.	
LYMAN, JAY R	1972
LYNN, WILLIAM L.	1968
LYONS, RICHARD A.	1969

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MAC ARTHUR, EARL W.	1971
MAC DONALD, MANLEY E	1944
MAC LEAN JR, C. B.	1963
MACALUSO, MICHAEL D	1972
MADDOX, MARION E.	1951
MAGENDZO, ABRAHAM	1969
MAGISOS, JOEL H.	1968
MAGOWAN, ROBERT E.	1967
MAHONEY, JAMES H.	1956
MALEY, DONALD	1949
MALI, PAUL	1966
MALIK, JOSEPH A.	1968
MALKAN, JEROME M.	1967
MALLARY, BENJAMIN E.	1932
MANCHAK, PAUL J.	1965
MANESS, MARION T.	1969
MANGANELLI, FRED D.	1959
MANNING, GEORGE E.	1971
MANNION, EDMUND J.	1972
MANSFIELD, ROBERT T.	1959
MANSFIELD, WESLEY B.	1970
MARBURGER, EDWARD F.	1948
MARCH, BRYCE D.	1961
MARCINOWSKI, MARY E.	1971
MARRAH, JOHN A.	1970
MARSHALL JR,THOMAS C	1941
MARSHALL, CHARLES R.	1971
MARTIN, DARIEL D	1972
MARTIN, DONALD H.	1971

MARTIN, GORDON E	1972
MARTIN, LOREN	1973
MARTIN, WALDO D.	1970
MARTIN, WILLIAM E.	1970
MARTINEZ, LEONARDO	1972
MARTINEZ, PETE	1970
MASLEY, PHILIP T	1966
MASON, EMMETT E.	1969
MASON, WILLIAM H.	1970
MASSENGILL, JOHN P.	1952
MASSEY, HAL	1965
MATTESON, GERALD R.	1966
MATTHEWS JR, PAUL J.	1972
MATTSON, HOMER A.	1970
MAUER, DONALD E.	1966
MAW, JAMES L.	1971
MAXCY, ELLIS O.	1941
MAXON, LLOYD M.	1970
MAYER, HERBERT C.	1940
MAYFIELD, WINIFRED A	1970
MAYS, WILLIAM A.	1954
MC ARTHUR, ROSS J.	1955
MC CABE, FRED J.	1970
MC CAGE, RONALD D.	1970
MC CAIN, JERRY C.	1959
MC CALLUM, HARRY N.	1967
MC CLARY, RAY H.	1967
MC CLEARY, JOSEPH L.	1967
MC CLELLAN, LARRY D.	1971
MC CLURE, CLOIS A.	
MC CRACKEN, JOHN D.	1970
MC CRORIE, THOMAS R.	1952
MC DOUGLE, LARRY G.	1971
MC DOWELL, LEONARD C	1964
MC ELHENY, JOHN R.	1960
MC EOWEN, ROBERT H.	1967
MC GAW, SIDNEY E.	1952
MC GINNIS, PATRICK T	1972
MC GIVNEY, JOSEPH H.	1967
MC INNIS, DONALD W.	1971
MC KECHNIE, GRAEME H	1966
MC KEE, RONALD R.	1971
MC KELL, WILLIAM E.	1970
MC KENNA, CONSTANCE	1971
MC KENZIE, CHARLES R	1971
MC KINNEY, FLOYD L.	1969
MC LENNAND, BERNARD	1971
MC LONEY WIRT L.	1965
MC MURRY, JAMES G.	1964
MC NAMARA, JAMES F.	1970
MC NEIL, JACKSON M.	1968
MC NEILL, JOSEPH G.	1970
MC PHERSON, DANIEL W	1971
MC PHERSON, WILLIAM	1972
MC ROBBIE, J. M.	1963
MC VICKER, HOWARD E.	1970
MEDEIROS, EDWARD J.	1970
MEERS, GARY D	1972
MEHAIL, SPIRO	1971
MEHALLIS, GEORGE	1963
MEIER, MARY A.	1969
MEIERHENRY, WESLEY C	1946
MEISNER, ROBERT G.	1967
MELINE, CHARLES W.	1965
MELLINGER, BARRY L.	1972
MELLMAN, ROBERT A.	1957
MENEGAT, PAUL A.	1953
MEOSKY, PAUL R.	1967
MERTZ, OTTO	1954
MESSERSCHMIDT, DALE	1967
MESSMAN, WARREN B.	1963
METZLER, JOHN H.	1970
MEYER, HARVEY K.	1951
MEYER, JOHN D.	1970
MEYER, JOHN M.	1969
MEYERS, ALBERT	1967
MEYERS, LARRY D.	1968
MICHEELS, WILLIAM J.	1941
MICHELSON, EINO S.	1956
MICHIE, JACK	1968
MIDDLETON, WILLIAM H	1962
MIDILI, JOHN A.	1970
MILAM, THOMAS R.	1968
MILAN, JOSEPH E	1972
MILLER JR, FRANK M.	1971
MILLER, AARON J.	1966
MILLER, CLARENCE M.	1968
MILLER, DAVID H.	1971
MILLER, DUDLEY B.	1965
MILLER, JACK D.	1971
MILLER, JAMES A.	1971
MILLER, JERRY L	1972
MILLER, JOHN G.	1954
MILLER, JOHN R.	1970
MILLER, L. PAUL	1939
MILLER, LARRY R.	1971
MILLER, MARK E.	1967
MILLER, MARY D	1971
MILLER, MURRAY L.	1947
MILLER, THOMAS W.	1958
MILLER, WAYNE E.	1969
MILLER, WILBUR R.	1960
MILLS, BOYD C.	1967
MILLS, EARL S.	1971
MILNOR, BRENT T.	1971
MINELLI, ERNEST L.	1957
MINKEVICH, GEORGE	1972
MINTON, GENE D.	1968
MITCHELL, JOHN	1954
MOEGENBURG, LOUIS A.	1969
MOELLER, CARL A.	1961
MOHEE, N. F.	1968
MONEY, HOMER E.	1956
MONGERSON, MARTIN D.	1968
MONROE, ALLEN L.	1970
MONROE, H. B.	1960
MONROE, LYNNE C.	1939
MONTELEONE, THOMAS I	1952
MONTELLO, PAUL A.	1968
MOODY, RICHARD D.	1968
MOON, DONALD E.	1968
MOONEY, JAMES J.	1967
MOORE, ALFRED H.	1954
MOORE, BILLY M	1973
MOORE, LELAND B.	1970
MOREHEAD, JAMES C.	1971
MORELAND JR, HENRY C	1970
MORGAN JR, ALFRED D.	1967
MORGAN SR, LEO D.	1966
MORGAN, DARYLE W.	1968
MORGAN, J. B.	1961
MORGAN, JACK W.	1951
MORGAN, JIMMY B.	1969
MORRILL, DAVID	1970
MORRIS, ALLEN E.	1971
MORRISEY, THOMAS J.	1965
MORRISON, JESSIE S.	1969
MORTIMER, WILLIAM E.	1956
MORTON, BERRY E.	1950
MOSHIER, KENNETH D	1973
MOSLEY, SAMUEL N.	1970
MOSS JR, JEROME	1960
MOSS JR, ROGER W	1972
MOSS, JOHN F.	1962
MOULLETTE, JOHN B.	1970
MOUTOUX, ALFRED C.	1948
MUDGETT, ALBERT G.	1958
MUDZO, MICHAEL G.	1970
MUEHLIG, JOHN E	1973
MUELLER, DENNIS L	1972

MULLER, ARTHUR E	1972
MULLER, ERWIN T.	1938
MUNCRIEF, MARTHA C	1973
MUND, RICHARD G.	1970
MUNGER, PAUL R.	1972
MUNISTERI, ANTHONY	1971
MUNS III, NEDOM C.	1969
MURBACH, NELSON J.	1949
MURPHY, JAMES O.	1972
MURRY, CLAIR A	1972
MUSGROVE, WILLIAM R.	19
MYERS, ROY E.	1971

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NAGLE, ROLAND F.	19
NAIR, RALPH K.	1950
NANNAY, ROBERT W.	1970
NAROFF, ARNOLD	1971
NASH, MC KINLEY M.	1972
NEALIS, MICHAEL F.	1951
NEASHAM, ERNEST R.	1968
NEE, JOHN G	1972
NEE, NELSEN V.	1971
NEEDHAM, RAYMOND J.	1969
NEFF, WILLIAM L.	1941
NELSON, A. FRANK	1955
NELSON, HILDING E.	1962
NELSON, HOWARD F.	1953
NELSON, LLOYD P.	1955
NELSON, ORVILLE W.	1967
NELSON, REX A.	1963
NESTEL, GERALD E.	1970
NESTOR, HAROLD M.	1971
NESWICK, LAWRENCE G.	1971
NEUBAUER, GERHARDT W	1956
NEUFELD, JACOB A.	1968
NEVITT, THOMAS A.	1966
NEWBURY, DAVID N.	1967
NEWKIRK, LOUIS V.	1929
NEWTON, ROBERT E.	1970
NICHOLS JR, GEORGE V	1971
NICHOLS, DWIGHT W.	1955
NICHOLS, JACK D.	1970
NICHOLSON, DAVID H.	1948
NICKERSON, PAUL S.	1947
NIELSEN, ARNOLD M.	1970
NIELSEN, ERWIN E.	1969
NIEMELA, ALBERT W.	1949
NIENHAUS, BERNARD J.	1971
NIHAN, GEORGES L	1973
NILSON, KENNETH	1931
NISH, DALE L.	1967
NOLL, ROBERT F.	1967
NORMAN, RALPH P.	1955
NORRIS, MARSENA M.	1968
NORTON, ELIZABETH N.	1970
NORTON, ROBERT E.	1967
NOTHOURFT, MARIE E	1972
NOVOSAD, JOHN P.	1971
NYE, PHARES S	1972
NYSTROM, DENNIS C.	1969

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O BRYANT, DAVID C.	1970
O CONNELL, JOHN F.	1971
O DELL, ROBERT D.	1963
O HARA, JAMES S	1972
O NEIL, IVOR R.	1972
O NEILL, JACK H.	1954
O NEILL, JOHN N.	1971
O TUEL, MAXCY B.	1969
OAKLEY, GARY D.	1970
OAKLEY, HUGH L.	1954
OAKS, MERRILL M.	1970
ODBERT, JOHN T.	1973
OGLE, LEWIS W.	1971
OGLESBY, JAMES R	1972
OGUNNIYI, OMOTOSHO	1969
OHLSON, ELI E.	1943
OLIVER, GEORGE L.	1970
OLIVER, WILMOT F.	1967
OLIVO, C. THOMAS	1954
OLSEN, EDWARD G.	1937
OLSEN, EUGENE A.	1968
OLSEN, FRED A.	1962
OLSEN, GEORGE A.	1971
OLSON, DAVID O.	1969
OLSON, DELMAR W.	1957
OLSON, HERBERT A.	1970
OLSON, JERRY C.	1964
OLSON, RICHARD R.	1971
OMAN, RONALD N.	1971
OPPELT, MARION O.	1967
ORLANDO, FRANK J	1972
ORR, RALPH O.	1970
ORR, WILLIAM H.	1970
OSBORN, JIMMIE D	1972
OSBURN, BURL N.	1939
OSORNO, WENDELL A	1972
OTTERSON, PEDER A.	1969
OUTCALT, RICHARD M.	1971
OWENS, HILDA F	1973
OXLEY, VINCENT E.	1969

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PA DELFORD, HAROLD E	1972
PAGE, CHARLES B.	1953
PAINE, HARRY W.	1943
PAINE, OLIVE	1930
PALMER, HAROLD G.	1950
PALOW, WILLIAM P.	1969
PANDOLPH, EUGENE J	1972
PANKOWSKI, DALLAS J.	1966
PAPP, ALEXANDER G.	19
PARDINI, LOUIS J.	1967
PARKER, DAVID W	1972
PARKES, GEORGE H.	1939
PARKHILL, GEORGE D.	1938
PARKS, DARRELL L.	1968
PARKS, GERALD A.	1969
PARNES, SIDNEY J.	1954
PARRY, ERNEST B.	1968
PASSMORE, JAMES L.	1968
PASTER, JULIUS	1959
PATE JR, DOVE H.	1970
PATTERSON JR, PHILIP	1968
PATTERSON, JOHN R.	1970
PAULIN, HENRY S.	1964
PAUTLER, ALBERT J.	1967
PAWELEK, ALAN R.	1950
PAWELEK, STANLEY J.	1941
PAYNE, AM V.	1965
PAYZER, MARVIN F.	1954
PEARSON, WILLIAM W.	1967
PEDERSEN, GEORGE L.	1957
PEEL, NANCY D.	1967
PEERSON, RICHARD H.	1969
PEIFFER JR, HERBERT	1939
PEITHMAN, ROSCOE E.	1955
PELLEGRIN JR, JOSEPH	1971
PENDERED, NORMAN C.	1951
PENDLETON, JOHN T	1973
PENN, THOMAS L.	1968
PENNER, WAYMAN R	1972
PENNY, FOREST L.	1960
PERDUE, SAUL M.	1954
PERKINS, LAWRENCE H.	1967

PERKINS, NEAL B.	1962
PERSHERN, FRANK R.	1967
PERSHING, REX W.	1970
PETER, RICHARD F.	1970
PETERS, DONALD F.	1959
PETERSEN, MOLEN L.	1971
PFAHL, ALVIN K.	1970
PHALLEN, CHARLES W.	1958
PHARES, GAIL J.	1962
PHILLIPS JR, MILTON	1967
PHILLIPS, AUGUSTUS C	1941
PHILLIPS, DONALD S.	1968
PHILLIPS, JOSEPH W.	1935
PHILLIPS, KENNETH	1950
PHILLIPS, LOREN D.	1954
PHILLIPS, THOMAS G.	1971
PHILLIPS, WILLIAM A	1973
PIERCE, WILLIAM F.	1967
PIERSALL, ARNOLD C.	1964
PINCKNEY, CHARLES W.	1953
PISANI, JOSEPH R	1972
PITTMAN, FRANK M.	1970
PLATA, MACIMINO	1971
PLUSCH, JAMES O.	1967
PODVIA, M. WAYNE	1972
POELZER, IRENE A	1972
POLESZAK, LEONARD J.	1969
POLETTE, DOUGLAS L.	1972
POLK, HAROLD J.	1969
POLOMSKY, JOHN V.	1969
PONTYNEN, BURTON A	1973
PORTER, CHARLES B.	1957
PORTER, HAROLD W.	1948
PORTER, SAM R.	1962
POTTER, DENIS A.	1973
POUCHER, KENNETH E.	1968
POULIN, DONALD A	1972
POWELL, PAUL E.	1954
POWER, ANDREW T.	1955
POWERS, G. PAT	1961
PRATER, ROBERT L.	1962
PRATT, ARDEN L.	1968
PRATZNER, FRANK C.	1969
PREITZ, CLARENCE H.	1969
PREWITT, ROGER W	1973
PRICE, CARROLL S.	1968
PRICE, DENNIS H.	1955
PRICE, ROBERT G	1973
PRICHARD, NEAL W.	1962
PRITCHARD, MIRIAM C.	1937
PROCTOR, BERNARD S.	1950
PRUSKI, JOHN	1958
PRUST, ZENAS A.	1964
PUCEL, DAVID J.	1966
PUFAHL, VIRGIL R.	1969
PUFFER, KAREL	1971
PUGH, DWIGHT A.	1969
PUTMAN, CARL E.	1970

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QUICK, OTHO J.	1954
QUIER, GEORGE T.	1969
QUINONES, LOUIS E	1973

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RAICHLE, HENRY F.	1969
RALSTROM, STIG E.	1969
RAMP, WAYNE S.	1956
RANDEL, STEPHEN V.	1957
RANDLEMAN, ROBERT R.	1961
RANDOLPH, JAMES R.	1972
RAPHAEL, MICHAEL A.	1971
RAPP, ALFRED V.	1972
RAU, GERALD N.	1971
RAY, J. EDGAR	1944
RAY, REX E.	1966
RAY, WILLZS F.	1957
RAYFORD, ERWIN W.	1967
REAMS, JAKE W.	1963
REBHORN, ELDON A.	1972
RECKERD, THOMAS E.	1970
REED, HOWARD O.	1948
REED, RICHARD L.	1971
REED, WILLIAM T.	1947
REESE, ROBERT M.	1954
REESER, GEORGE W.	1971
REHORN, GLEN E	1972
REID, DEMPSEY E.	1956
REID, RICHARD A	1972
REIMER, MILTON K.	1968
REISENGER, RAYMOND H	1970
RELYEA, GLADYS M.	1937
RELYEA, GLADYS M.	1937
REMICK, EDWARD L.	
REPP, VICTOR E.	1970
RESNICK, HAROLD S.	1970
RESSLER, RALPH	1966
RICE JR, JOSEPH A.	1971
RICE, CHARLES M. M.	1958
RICE, DICK C.	1966
RICE, DON A.	1969
RICH, MILDRED K.	1958
RICHARDS, FREDDIE L	1972
RICHARDS, JOHN V.	1970
RICHARDS, KENVYN B.	1970
RICHARDS, MAURICE F.	1950
RICHARDS, THOMAS A	1972
RICHARDSON, ROBERT B	1967
RICHARDSON, WILLIAM	1972
RICKER, PHILLIP E.	1965
RIDLEY JR, WILLIAM H	1970
RIETH, CLAUDE E.	1966
RIGBY, WILLIAM H	1972
RIGGS, DONALD D.	1971
RILEY, E. C.	1970
RILEY, JOHN N.	1972
RIMLER, GEORGE W.	1969
RINCK, JOE A.	1968
RINEHART, RICHARD L.	1966
RISHER, CHARLES G.	1953
RIVELL, AMOS C	1973
ROBBINS, EVELYN G.	1949
ROBERSON, ROY P.	1967
ROBERTS JR, LEWIS	1972
ROBERTS, EDWARD R.	1971
ROBERTS, LAURENCE A.	1968
ROBERTS, NORMAN N.	1967
ROBERTSON JR, LUTHER	1970
ROBERTSON, LYLE R.	1968
ROBINSON, CLARENCE L	1972
ROBINSON, CLARK N.	1947
ROBINSON, FRANK E.	1955
ROBINSON, JAMES W.	1967
ROBINSON, MENDEL L.	1970
ROBINSON, ORIN R.	1965
ROBINSON, WALTER J.	1950
ROBINSON, WILLIAM O.	1971
ROEDER, JOHN A.	1972
ROGAN, WILLIAM B	1973
ROKUSEK, H. J.	1964
ROLLINGS, JAMES W.	1967
RONEY, MAURICE W.	1964
RONODIDIJOJO, SOEWAN	1968
ROSENQUIST, BARBARA	1971
ROSIN, WILLIAM J.	1969
ROSS, B. JOHN	1971
ROSS, BENJAMIN P.	1944
ROSS, HERBERT J.	1970

ROSS, RAYMOND J.	1966
ROSSER, ARTHUR J.	1968
ROTHENBERG, HARVEY D	1972
ROTHMAN, ROBERT A.	1969
ROUTH, JERRY D.	1970
ROWEN, MILTON S.	1969
ROWLETT, JOHN D.	1960
ROWNTREE, URWIN	1951
ROY, WENDELL L.	1963
RUBIN, MORRIS M.	1950
RUDIGER, ELMER R.	1952
RUDISILL, ALVIN E.	1969
RUEHL, PHILIP W.	1961
RUGGLES, STANFORD D.	1969
RUITER, WILLIAM W.	1971
RUMMELL, WINFIELD R.	1971
RUMPF, EDWIN L.	1954
RUNNALLS, JAMES J.	1965
RUSSELL JR, JAMES A.	1967
RUSSELL, ELLSWORTH M	1950
RUSSELL, GENE H.	1970
RUSSELL, LESTER F.	1968
RUSSELL, SAMUEL E.	1966
RUTEN, WILLIAM H.	1953
RUTHERFORD, WILLIAM	1962
RYAN, CHESTER M.	1963
RYAN, JAMES E.	1964
RYAN, ROBERT D.	1964

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SADA, PABLO M.	1971
SAGE, JAMES E.	1971
SAINTY, GEOFFREY E	1972
SALMON, DANIEL A.	1965
SALTEN, DAVID G.	1944
SANDBERG, NINA M.	1968
SANDERS, LEROY J.	1967
SANDERS, LESTER E.	1967
SANDERSON, HERBERT	1948
SANDMAN, CHARLES W.	1969
SARGENT, WILLIAM T.	1956
SAWYER, DAVID E.	1972
SAYOVITZ, JOSEPH J.	1955
SCHACHT, ROBERT C.	1971
SCHAEFER, CARL J.	1959
SCHAEFER, ROGER A.	1969
SCHANBACHER, EUGENE	1961
SCHANK, KENNETH L.	1965
SCHELLER, THOMAS G.	1967
SCHEMPF, KENNETH W	1972
SCHENCK, JOHN P.	1969
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SCHMIDT JR, FRED J.	1941
SCHMIDT, HOWARD R.	1971
SCHMIDT, RICHARD W	1971
SCHMITT, CARLOS R.	1971
SCHMITT, MARSHALL L.	1953
SCHMITT, VICTOR A.	1953
SCHOEPPLER, JACOB	1958
SCHOESLER, RONALD D.	1971
SCHOLES, CHARLES E.	1968
SCHOLLMEYER, FRED C	1973
SCHORLING, HORACE O.	1950
SCHOTT, WILLIAM J.	1954
SCHRAG, MARIE C.	1972
SCHRAMM, DWAYNE G.	1969
SCHREIBER, ERNEST	1967
SCHROEDER, PAUL E	1973
SCHULER, CHARLES A.	1966
SCHULTZ, IRWIN J.	1949
SCHUMM, FRED C	1972
SCHURE, ALEXANDER	1950
SCHWARTZ, FREDERICK	1973
SCHWEINFURTH, LUDWIG	1969
SCOBEY, MARY-MARGARE	
SCOTT, CHARLES P.	1943
SCOTT, ROBERT E.	1965
SEAL, MICHAEL R.	1969
SEAMAN, DON F.	1968
SEARS JR, WILLIAM P.	1930
SEARS JR, WOODROW H.	1971
SECHREST, CHARLES H.	1953
SECKENDORF, ROBERT S	1960
SEDGWICK, LORRY K.	1965
SEEFIELD, KERMIT A.	1949
SEEHOFF, JESSE	1942
SEGUIN, ARMAND M	1973
SEIDEL, JOHN J.	1951
SEIGLER, CLAUDE I.	1970
SELF JR, JOHN M.	1967
SELLON, WILLIAM A.	1950
SELMAN, JAMES W.	1967
SENTENEY, GEORGE W.	1955
SERGEANT, HAROLD A.	1968
SERRAS, VIDAL V	1972
SEXTON, WILLIAM E.	1965
SHACKELFORD, RICHARD	
SHAFER, CARL I.	1961
SHANTHAMALLAPPA, B.	1950
SHARMA, BALDEV R.	1967
SHAW, GERALD H.	1968
SHEFFIECK JR, CHARLE	1969
SHEFFIELD, EVERETT A	1969
SHELL, LON R.	1971
SHELTON, JOHN A.	1968
SHEMICK, JOHN M.	1960
SHEPARD, JON M.	1968
SHEPPARD, LAWRENCE E	1967
SHERCK, CHARLES P.	1969
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SNOW, JOHN W.	1966
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SVENDSEN, CLARENCE R	1970
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TEMPLE, CHARLES M.	1970
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TERRY, THOMAS P.	1972
THATCHER, GLENN M.	1970
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THOMAS JR, WADE F.	1957
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INDEX TO KEY WORD DESCRIPTORS ASSIGNED TO DISSERTATION ABSTRACTS FOR INDUSTRIAL ARTS, TRADE AND INDUSTRIAL AND TECHNICAL EDUCATION

D.L. JELDEN, EDITOR

A

---- - Accreditation; See CERT
ACHV - Achievement
ACTV - Activity
ACOU - Accountability, Educational
ADED - Adult Education; See CONT
ADMN - Administration See also LEAD, SUPR
ADVC - Advisory Committees
AERO - Aeronautics and Aerospace See also AVN
---- - Affective; See ATTD
AIAA - American Industrial Arts Association
---- - Analysis; See CRCN, CMPT
---- - American Industry Program; See also INPG
APRT - Apprenticeship
ARCH - Architecture
---- - Area Vocational Schools; See also VOED, HS
ARTC - Arts and Crafts; See also CRAF
---- - Associate degree; See JUCO, EVPA, PRPL
ATMN - Automation
ATTD - Attitude (Affective)
AUTO - Auto, Auto Mechanics
AV - Audio Visual; See also FILM, INSD, MEDA
AVA -- American Vocational Association
AVN - Aviation
AVOC - Avocational (Leisure Time)
---- - Aptitude: See PRTR

B

---- - Bachelors Degree; See GRAD, EVPR, PRPL
BDGT - Budget; See also FINA
BHOJ - Behavioral Objectives; See also OBJ
---- - Bricklaying; See BILD, CNST
BILD - Building Trades; See also CONC, CNST
BIOG - Biographies, Autobiographies
BLMA - Materials (Building and Const)

C

---- - Cabinet making See FURN, WOOD
CERM - Ceramics
CERT - Certification
---- - Chemistry; See SCIN
CLTH - Clothing and Textiles
---- - Clubs; See AIAA, AVA, NEA, PROR
---- - Cognitive; See KNOW
---- - College; See HIED, JUCO
---- - Community College; See JUCO, HIED
CMPT - Competencies
CANA - Canada
CNST - Construction; See also BILD, CONC
COE - Cooperative Occupational Education (Workstudy)
COFS - Course of Study
COLR - Color
---- - Community College; See JUCO
COMM - Communication; See also GRAP
CONC - Concrete
CONT - Continuing Education; See also ADED
COUN - Counseling; See GUID, VOGI
CPTR - Computer (Programming, usage, instruction)
CRAF - Crafts; See also JEWL
CRCN - Curriculum Construction
CRED - Career Education
CRMD - Curriculum Models
CRTY - Creativity
CULT - Culture
CURR - Curriuclum
---- - Curriculum Projects; See IMPG
CSED - Consumer Education: See GNED
---- - Concept: See METH, INPG

D

DEMO - Demonstration
DESN - Design
DEYH - Deprived Youth
---- - Differentiated Staffing; See METH, ADMN
---- - Disadvantages; See EXCD
DIED - Distributive Education
DISC - Discriptive Geometry
DO - Diversified Occupation
DPOT - Drop-outs
DRAF - Drafting/Drawing
---- - Doctorate; See GRAD, EVPR, PRPL
DVED - Driver Education

E

ELEL - Electricity/Electronics
ELEM - Elementary School
ENGR - Engineering
ENVT - Environmental Concersn
EQIP - Equipment; See also FACP
ETHN - Ethnic Groups
EVFA - Evaluation - Faculty; See also SELF
EVPN - Evaluation - Personnel

EVPR - Evaluation - Program (Learning) (Status) (Planning)
EVST - Evaluation - Student; See also TEST
EXCD - Exceptional Children (Disadvantaged)
EXPR - Experimental Studies
EXCR - Extra Curricular

F

FACP - Facility Planning
FACU - Faculty; See also EVFA
FAID - Financial Aid Federal/State
FILM - Films; See also AV
FINA - Finances; See also BDGT, ACOU
FLUD - Fluid Power
FORN - Foreign Countries
FORS - Forests
FOUP - Follow-up; See also PLAC
FOUN - Foundry and Patternmaking
FURN - Furniture
FUTR - Future; See also TRND

G

GNED - General Education
GNSH - General Shop
---- - Gifted See EXCD
---- - Girls, See WOMN
GRAD - Graduate Programs;:See also EVPR, PRPL
GRAP - Graphics; See also PHOT, PRNT, DRAF
GUID - Guidance and Counseling; See also VOGI
GOVT - Government (Federal/State)

H

HS - High School; See also PRSH
HIED - Higher Education (Grade 13 plus)
HIST - History

I

---- - Industrial Arts Curriculum Program, See INPG
ININ - Individualized Instruction; See also PROG
I A - Industrial Arts
I E - Industrial Education
---- - Industrial Science; See I E
---- - Industrial Technology; See TCED
IND. - Industry
INPG - Innovative Programs
INSD - Instructional Devices; See also AV, FILM, MEDA
INSR - In-Service Education
INSM - Instructional Materials
I T - Industrial Technology; See also TECH
INST - Instrumentation
IACP - Industrial Arts Curriculum Project; See also INPG

J

JEWL - Jewelry and Lapidary
---- - Journalism; See PRNT
JRHS - Junior High School
JUCO - Junior College; See also HIED

K

KNOW - Knowledge

L

LABR - Labor (Unions)
---- - Learning Activity Packages (Laps) See METH, EXPR, ININ, INSM
LAOR - Laboratory Organization (Planning); See also FACP
LEAD - Leadership; See also ADMN, SUPR
LEGI - Legislation
---- - Learning Theory; See INPG, METH, EXPR
---- - Leisure Time; See AVOC
---- - Leather, See CRAF
LIAB - Liability; See also SAFE
LMNT - Laminating
---- - Lumber; See FORS, WOOD

M

MAIN - Maintenance
MANG - Management
MANU - Manufacturing
---- - Materials (Building and Construction); See BLMA
---- - Masters Degree; See GRAD, EVPR, PRPL
---- - Manpower, See VOED, ADED
MATH - Mathematics
MCTG - Micro Teaching
MEDA - Media; See also AV, FILM, INSD, INSM
---- - Mentally Retarded; See EXCD
---- - Mechanical Drawing; See DRAF
MEPR - Metal Process
META - Metallurgy
METH - Methods; See also PROG
METL - Metals, See also FOUN, WELD, SHET
MNIP - Manipulative; See SKIL
MNTR - Manual Training
---- - Molding; See PLAS
MOTI - Motivation
MSPR - Mass Production
---- - Model, See CRMD

N

NDEF - National Defense

NEA - National Education Association

O

OBJ - Objectives; See also BHOJ
OCCU - Occupations
OCIN - Occupational Information Education
OCSU - Occupational Surveys
---- - Organizations; See also AIAA, AVA, NEA, PROR

P

---- - Paraprofessionals; See TEED
PATN - Patternmaking, See FOUN
PERS - Personnel; See also EVPN
---- - Performance Objectives, See BHOJ
PHIL - Philosophy
PHOT - Photography; See also GRAP
PHYS - Physics
PLAC - Placement; See also FOUP
PLAS - Plastics; See also SYNT
POWR - Power; See also AERO, AUTO, FLUD, AVN
PR - Public Relations
PRAR - Practical Arts
PRED - Prediction
PRNT - Printing; See also GRAP
PROB - Problem Solving
PROC - Professional Courses
PROD - Products
PROG - Programmed Learning
PROJ - Projects
PROR - Professional Organizations
PRPL - Program Planning; See also CRCN
PRSH - Private Schools; See also RELG
PRTR - Personality Traits
PSYC - Psychology
---- - Psychomotor; See SKIL, MNIP

R

READ - Reading
RECR - Recreation See also AVOC
RECT - Recruitment; See also SELC
RELG - Religion; See also PRSH
RES - Research - Research Procedures
---- - Retarded; See EXCD

S

SAFE - Safety; See also LIAB
SCIN - Science See also PHYS
SELC - Selection; See also RECT
SELF - Self-Evaluation, Self-Concept
SHET - Sheet Metal
SIML - Simulation
SKIL - Skill (Psychomotor); See MNIP
---- - Shop Planning; See FACP
---- - Specialist Degree; See GRAD, EVPR, PRPL, HIED
STTG - Student Teaching; See also TEED
SUPR - Supervision; See also ADMN, LEAD
SYNT - Synthetics; See also PLAS
---- - Systems (Learning, Instructional, etc) See METH, PROG

T

TCED - Technical Education
TECH - Technology
TEED - Teacher Education; See also STTG
TEEP - Teacher Effectiveness; See also EVFA
TEST - Test Development; See also EVST
---- - Textiles; See CLTH
T I - Trades and Industries
TOOL - Tools
TRAN - Transportation
TRND - Trends
TRNG - Training

U

---- - Under Privileged; See EXCD
---- - Unions; See LABR
UNTS - Unit Shop
---- - University; See HIED, JUCO
---- - Upholstery; See FURN
USA - United States of America

V

---- - Videotape; See also FILM AV, INSD, INSM
VOED - Vocational Education
VOGI - Vocational Guidance; See also GUID
VORE - Vocational Rehabilitation and Retraining

W

WELD - Welding
WOMN - Women
WOOD - Wood (Forest Products)
---- - Workstudy; See COE, INSR
WDFN - Woodfinishing

SINGLE DESCRIPTOR LISTING

ACHV

AUTHOR	DATE
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BATES, IVAN W.	1971
BECK, BURREL H.	1967
BETTIS, LLOYD E.	1971
BLOCK, RUDOLPH C.	1970
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COOMER, JERRY W.	1971
DAINES, JAMES R.	1968
DANOVITZ, SAUL	1957
DEAN, C. THOMAS	1951
DEMPSEY, DON G.	1972
DOWNS, WILLIAM A.	1968
EIDE, ARVID R	1973
EVANCHO, MICHAEL	1947
FAUROT, LYLE M	1973
GOLDMAN, ROBERT C.	1971
GRIFFIN, JAMES F.	1970
HANCOX, FREDERICK J.	1969
HARRIS, ROBERT C.	1970
HATLEY, JIMMY D.	1969
HEGGEN, JAMES R.	1967
HEPLER, EARL R.	1957
HORBAKE, R. LEE	1942
HORINE, JOHN W.	1961
HUSS, WILLIAM E.	1951
INDRESANO, JOSEPH P	1973
INGRAM, FRANKLIN C.	1966
IRWIN, JACK L	1973
JACOBSEN, ECKHART A.	1957
JASNOSZ, THOMAS A.	1969
JENKINS, NORMAN L.	1969
JENNINGS, GERALD L.	1968
JOHNSON, FRANK F.	1971
JOHNSON, LEONARD R.	1971
JOHNSON, RUFUS G.	1949
KESEMAN, CHARLES E.	1967
KIKER, CHARLES M	1973
KOEHLER, EVERETT E.	1959
KOLLIN, ROBERT	1971
KRUBECK, FLOYD E.	1954
LACROIX, WILLIAM J.	1971
LANDECKER, LOUIS	1969
LONDON, HOYT H.	1934
LUDLOW, GERALD C	1973
LYONS, RICHARD A.	1969
MARCH, BRYCE D.	1961
MAXON, LLOYD M.	1970
MAYS, WILLIAM A.	1954
MC GINNIS, PATRICK T	1972
MC VICKER, HOWARD E.	1970
MEERS, GARY D	1972
MICHIE, JACK	1968
MIDDLETON, WILLIAM H	1962
MILLER, LARRY R.	1971
MILLER, WAYNE E.	1969
MOONEY, JAMES J.	1967
MOORE, LELAND B.	1970
NESWICK, LAWRENCE G.	1971
PERSHERN, FRANK R.	1967
PITTMAN, FRANK M.	1970
POWERS, G. PAT	1961
PRATZNER, FRANK C.	1969
RANDOLPH, JAMES R.	1972
RAU, GERALD N.	1971
RICHARDS, MAURICE F.	1950
RISHER, CHARLES G.	1953
ROSIN, WILLIAM J.	1969
ROUTH, JERRY D.	1970
RUSSELL JR, JAMES A.	1967
SCHANBACHER, EUGENE	1961
SCHUMM, FRED C	1972
SEAL, MICHAEL R.	1969
SPAULDING, LLOYD F.	1971
STAMBOOLIAN JR, JOHN	1972
STEPHENSON, DONALD J	1970
STILLERMAN, MANUEL	1970
TEEL, DEAN A.	1967
THIEME, EBERHARD	1965
TILLEY, TRUMAN E.	1945
TORRES, LEONARD	1963
WALGREN, FLOYD B.	1971
WHINFIELD, RICHARD W	1969
WILKINSON, WILLIAM E	1972
WILLS, VERNON L.	1965
WRIGHT, LAWRENCE S.	1954
YOUNG, ROBERT W.	1966

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AUTHOR	DATE
CLARK, DONALD L.	1967
DOWNS, WILLIAM A.	1968
DUNCAN, GLENN S.	1950
ERICKSON, JOHN H.	1953
GLISMANN, LEONARD W.	1967
GRANEY, MAURICE R.	1942
GUNTHER, THERESA C.	1931
HUSS, WILLIAM E.	1951
JOHNSTON, JOHN L.	1956
KRUMBIEGEL, WALTER D	1955
LICHTBLAU, LEONARD R	1958
LJOSTAD, RODNEY A.	1965
LLOYD, CLIFFORD J.	1968
MIDDLETON, WILLIAM H	1962
THIEME, EBERHARD	1965
THOMAS, MAURICE G.	1968

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AUTHOR	DATE
BOYER, JOHN W.	1970
HORVATH, WILLIAM	1972
SHYMONIAK, LEONARD R	1972
SORENSON, WARREN W	1972

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AUTHOR	DATE
ADAMS, DEWEY A.	1966
AINSWORTH, CHESTER B	1956
BARRINGER, DEAN	1971
BARTLETT, WILLIS E.	1967
BERGSTROM, HOWARD E.	1965

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AUTHOR	DATE
BONNER, HAROLD S	1972
BOSTROM, EDWIN O.	1971
BOVENIZER, ELDRED R.	1968
BOWLAN, SIZEMORE	1971
BOYER, JOHN W.	1970
BRILL, DONALD M	1972
BROWN, MARILYN K.	1970
BUZZELL, CHARLES H.	1970
CHAMBLISS, KINNETH M	1966
CHILSON, JOHN S.	1969
COHEN, CHESTER G.	1970
COOVER, SHRIVER L.	1941
CRAWFORD JR, BRYANT	1961
CRAWFORD, NEWTON E.	1972
CRUDDEN, PAUL B.	1944
CUTLER, THEODORE H.	1948
DANOVITZ, SAUL	1957
DAVIDSON, ADELE	1960
DENOVA, CHARLES C.	1968
DOUGLASS, STEPHEN A.	
ESTLE, EDWIN F.	1966
FARR, WILBUR J.	1958
FLAHERTY, HUGH	1944
FRANK JR, HARRY E.	1968
GEARING, PHILLIP	1970
GRAY, THOMAS E.	1970
GREGG, MURRY C.	1972
GRELL, DARRELL D.	1967
HANSEN, GARY B.	1971
HARVEY, DAVID W	1971
HEALAS, DONALD V.	1972
HOERNER, HARRY J.	1969
HOGHAUG, HAROLD T.	1971
HUTCHERSON, ETHEL M.	1966
INGRAM, THEODORE	1971
JAESCHKE, DONALD P.	1971
JOHNSON, CARL R	1972
JONES, CHARLES I.	1967
KARNES, JAMES B.	1966
KAUFMAN, CHARLES W.	1967
KEEP, ROGER L	1973
KHOSHZAMIR, FIROUZ	1971
LEAN, ARTHUR E.	1948
LOUGHLIN, RICHARD L.	1948
LOVELESS, AUSTIN G.	1962
LUY, JACK A.	1964
LYMAN, JAY R	1972
MADDOX, MARION E.	1951
MUDZO, MICHAEL G.	1970
MUND, RICHARD G.	1970
NAGLE, ROLAND F.	19
NICHOLSON, DAVID H.	1948
O TUEL, MAXCY B.	1969
OSBURN, BURL N.	1939
PENNER, WAYMAN R	1972
PODVIA, M. WAYNE	1972
PRICE, DENNIS H.	1955
RAY, J. EDGAR	1944
REISENGER, RAYMOND H	1970
ROBINSON, JAMES W.	1967
SCHOLES, CHARLES E.	1968
SHELTON, JOHN A.	1968
THORNE III, EDWARD H	1972
TROOBOFF, BENJAMIN M	1968
VANDEBERG, LOYD W.	1955
VERMEULEN, ROBERT	1968
WEBB, R. IAN A.	1971
WHITE, LELAND W.	1966
WILLIAMSON, MERRILL	1958
WREN, HAROLD A.	1941

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AUTHOR	DATE
ALLEN, FLEET D.	1971
ARNOLD, JOSEPH P.	1965
BUXTON, ALAN	1972
CARLSON, HENRY L.	1967
JOBE, MAX E	1972
JOHNSON, FRANKLIN R.	1969
KORB, AUGUST W	1972
LAHREN, JAMES A.	1970
LAND, MING H.	1970
LAND, SAMUEL L.	1931
MC INNIS, DONALD W.	1971
MC KINNEY, FLOYD L.	1969
OLSON, HERBERT A.	1970
REID, RICHARD A	1972
ROGAN, WILLIAM B	1973

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DOLEZAL, WILMA M.	1968
DOUGHERTY, DORA J.	1955
KIKER, CHARLES M	1973
MILLER, JERRY L	1972
OTTERSON, PEDER A.	1969
RINCK, JOE A.	1966
SANDERS, LEROY J.	1967
SCHMIDT, HOWARD R.	1971
SIMONS, ROBERT M.	1969
STEPHENS, KENT G	1972
WHYBARK, DAVID C.	1967
WITT, NORMAN E.	1969
WOOD, MILTON E	1973

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AUTHOR	DATE
BELL, CLAUDE A.	1964
HORTON, GEORGE R.	1967

APRT

AUTHOR	DATE
BERGVIN, PAUL E.	1945
CRABTREE, JAMES S.	1967
DOBSON, CLIFFORD G.	1956
DREW, ALFRED S.	1962
EVANS, RUPERT N.	1950
HAGEMEYER, RICHARD H	1960
HAMMER, GARLAND G.	1951
HATALSAN, JOHN W.	1963
HOSLER, FRED W.	1938
JOHNSON, MARVIN E.	1959
LEE, MOON Y	1972
NIEMELA, ALBERT W.	1949
PEDERSEN, GEORGE L.	1957
SHIGETOMI, SAMSON S.	1970
VAN DUSEN, EDWARD B.	1948
VAN OOT, BENJAMIN H.	1932
WHITE, DAVID L.	1973
ZANKOWICH, PAUL	1956

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ALDEN, RICHARD S.	1971
EATON, MERRILL T.	1932
JOHNSTON, KENNETH G.	1966
TWOMBLY, ROBERT C.	1968
VOLPE, GERALD	1969
WAKITA, OSAMU A.	1970
WEHRLI, ROBERT	1968

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AUTHOR	DATE
KOHLER, RICHARD C.	1951
LANDERS, FREDERICK W	1937
ROBBINS, EVELYN G.	1949
SCHMIDT JR, FRED J.	1941
ZANKOWICH, PAUL	1956

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AUTHOR	DATE
BAKER, GEORGE L.	1970
DEAN, ROBERT D.	1959
HUSUNG, WILLIAM T.	1970
KURIEN, CHEMPALATHAR	1967

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AUTHOR	DATE
BARROW, RICHARD W.	1969
CALHOUN, MARJORIE R.	1970
COMER, JOHN C.	1970
COMSTOCK, THOMAS W.	1969
DROST, JIM L.	1970
FINCH, CURTIS R.	1969
GRAY, JAMES A.	1969
GROTE, CHARLES N.	1960
HILDRETH JR, EDDIE	1972
HOBBS, ADDISON S.	1971
KAVIEFF, MELVIN C.	1961
KINKER, H. ROBERT	1949
MC LENNAND, BERNARD	1971
PISANI, JOSEPH R	1972
POUCHER, KENNETH E.	1968
RUDIGER, ELMER R.	1952
SHARMA, BALDEV R.	1967
SNOW, JOHN W.	1966
STEPHENSON, DONALD J	1970
SWANSON, RICHARD A.	1968
TAYLOR, HENRY T	1973
WALKER, LLOYD R.	1946
WALLACE, NORMAN E.	1968
WOMACK, WILLIAM M.	1971
YUNG, JOHN E.	1965

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AUTHOR	DATE
BARTEL, CARL R.	1959

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AUTHOR	DATE
BARON, ANDREW W.	1968
DENNISON, BOBBY	1970
DUTTON, BERNARD	1966
ELLIOTT, CHARLES A.	1958
ENTORF, JOHN F.	1967
EPPLER, THOMAS L.	1969
GLAZENER, EVERETT R.	1958
GRONEMAN, CHRIS	1950
GRUEN, CLEMENS A	1973
HARMON, JAMES S.	1969
HESS, HARRY L.	1969
HICKMAN, KEITH F.	1967
HOERNER, JAMES L.	1969
JENKINS, JOHN D.	1969
JONES, GARY H.	1969
JUSSIM, ESTELLE	1970
NESTEL, GERALD E.	1970
NEWTON, ROBERT E.	1970
NYSTROM, DENNIS C.	1969
ROUTH, JERRY D.	1970
SMITH, EARL J.	1968
SUMTER, PAUL E.	1969
WRIGHT, OSCAR W.	1954
YOUNG, WILLIAM H.	1969

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AUTHOR	DATE
BAKER, GLENN S.	1968
BATES, IVAN W.	1971
BRUSH JR, GEORGE W.	1969
FINLEY, LUTHER E.	1954
FLAHERTY, HUGH	1944
GRANDCHAMP, ROBERT J	1971
HENNIG, JAMES F.	1970
JULIAN, LESTER J.	1953
OTTERSON, PEDER A.	1969
PAWELEK, ALAN R.	1950
PHILLIPS, JOSEPH W.	1935
RECKERD, THOMAS E.	1970
RINCK, JOE A.	1968
SANDERS, LEROY J.	1967
SIMONS, ROBERT M.	1969
SPAULDING, ROLAND H.	1936
WHYBARK, DAVID C.	1967

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AUTHOR	DATE
BAGLEY, RONALD E.	1965
BENSON, KENNETH R.	1956
BIEDLER, JOHN S.	1958
BURDETTE JR, WALTER	1955
CANTOR, ROBERT L.	1952
CRAWFORD JR, BRYANT	1961
DANOVITZ, SAUL	1957
GARBEE, EUGENE E.	1949
GRONEMAN, CHRIS	1950
HAMPTON JR, ISAAC P.	1959
HUKILL, VIRON N.	1958
JACKSON, PETER A.	1965
KIMBALL, KENNETH R.	1967
LANDERS, FREDERICK W	1937
MARSHALL JR,THOMAS C	1941
MAYFIELD, WINIFRED A	1970
NELSON, LLOYD P.	1955
OSBURN, BURL N.	1939
PHILLIPS, KENNETH	1950
SHOEMAKER, CHARLES E	1961
SOLA, PETER A	1972

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AUTHOR	DATE
ALDRICH III, DANIEL	1972
ANDERSON, ERNEST F.	1966
BARLOW, GENE A.	1971
BUNTEN, CHARLES A.	1955
CAGE, BOBBY N.	1968
FORBES, ROY H.	1970
FOWLER, HARMON R.	1970
GOISHI, FRANK H.	1970
GRAMBERG, MERLYN L.	1971
HICKMAN, KEITH F.	1967
JUANG, HWAI-I	1972
KOEHLER, MYRON	1972
MC NAMARA, JAMES F.	1970
PARRY, ERNEST B.	1968
PETERSEN, MOLEN L.	1971
ROBERTSON, LYLE R.	1968
SHYMONIAK, LEONARD R	1972
SORENSON, WARREN W	1972
VANDER LINDE, ALBERT	1971

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AUTHOR	DATE
ALEXANDER, WILLIAM F	1969
ALLEN, DELL K	1973
CREMER, KENNETH D.	1970
FORBES, ROY H.	1970
HARRIS, ROBERT C.	1970
HENNIG, JAMES F.	1970
JONES, CHARLES I.	1967
JURALEWICZ, RICHARD	1966
KRUPPA, RICHARD A.	1970
LARSON, CURTIS G.	1971
NEVITT, THOMAS A.	1966
NORRIS, MARSENA M.	1968
SCHWEINFURTH, LUDWIG	1969
STRICKLAND, THOMAS W	1959
TALKINGTON, JOE E.	1962
VESPER, KARL H.	1969

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AUTHOR	DATE
BRAME, WILLIAM E.	1967
CASSIMATIS, PETER J.	1967
GALLUP, LELLAND L.	1970
KAFFER, FRED C.	1941
NEUBAUER, GERHARDT W	1956

BIOG

AUTHOR	DATE
DYE, CHARLES M.	1971
HAMMER, GERALD K.	1962
HEJKAL, OTTO C.	1950
JOHNSTON, KENNETH G.	1966
LA BOUNTY JR, HUGH D	1961
MC PHERSON, WILLIAM	1972
MOODY, RICHARD D.	1968
TWOMBLY, ROBERT C.	1968
YARRINGTON, HOLLIS R	1970

BLMA

AUTHOR	DATE
BENJAMIN, NEAL B.	1969
BERGSTROM, PHILIP G.	1970
ENVICK, DONALD D.	1968
GREENWALD, MARTIN L	1972
JARED, ALVA H.	1968
KAISER, HENRY	1968
KAPLAN, WILLIAM A.	1970
STOKES, VERNON L.	1971
WAITKUS, LORIN V.	1971

CERM

AUTHOR	DATE
BRENNAN, THOMAS J.	1953
FRITZ, ROBERT C.	1960
PAULIN, HENRY S.	1964

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AUTHOR	DATE
BAILEY, DONALD A.	1970
BOAZ, HOLLAND E.	1965
BRENCKLE, AUTHUR G.	1968
BROWN, ROBERT D.	1955
CONLEY, FRANKLIN	1968
DARDEN, BYRNES L.	1951
DELZAR, CHRISTIAN L.	1972
EARHART, CECILIA R.	1946
JACKEY, DAVID F.	1933
JOHNSON, ELOUISE E.	1967
LAUDA, DONALD P.	1966
LUCY, JOHN H.	1971
MELLINGER, BARRY L.	1972
NYE, PHARES S	1972
ORR, RALPH O.	1970
PFAHL, ALVIN K.	1970
PHILLIPS, WILLIAM A	1973
PROCTOR, BERNARD S.	1950
RIVELL, AMOS C	1973
SAYOVITZ, JOSEPH J.	1955
STANTON, WILLIAM A.	1967
STOUGH, KENNETH F.	1968
VAUGHN, MAURICE S.	1967
WALLACE, NORMAN E.	1968
WHYBARK, DAVID C.	1967
WRIGLEY, MARGARET	1968
ZANE, LAWRENCE F.	1968

CLTH

AUTHOR	DATE
BROWN, NATHAN	1954

CMPT

AUTHOR	DATE
BALTIMORE, JIMMY R	1972
BJORNERUD, JAMES A.	1970
BOTSFORD, JON F.	1972
BRIGGS, LLOYD D.	1971
BROWN, JAMES T	1973
BROWN, WALTER E.	1971
EDWARDS, JOHN T.	1970
ENVICK, ROBERT M.	1970
ERPELDING, LAWRENCE	1972
FAHRLANDER, DANIEL C	1973
FRANTZ JR, NEVIN R.	1967
GALLUP, LELLAND L.	1970
GLEASON, WILLIAM E.	1967
GUNDERSON, ORLEY D.	1971
GURBACH, THOMAS W	1973
HALE, LESTER W.	1967
HANSBURG, HENRY	1935
HILL, EDWIN K.	1968
HULLE, WILLIAM A.	1972
JACKMAN, DUANE A.	1961
JOHNSON, ROBERT I.	1958
JOHNSON, WAYNE C.	1969
KEEP, ROGER L	1973
KEIL, RAYMOND L.	1966
LINDAHL, DONALD G.	1971
MACALUSO, MICHAEL D	1972
MANNING, GEORGE E.	1971
MANSFIELD, ROBERT T.	1959
MARTIN, DARIEL D	1972
MINELLI, ERNEST L.	1957
OUTCALT, RICHARD M.	1971
PANDOLPH, EUGENE J	1972
PHILLIPS, WILLIAM A	1973
RIVELL, AMOS C	1973
STEVENSON, JAMES E.	1953
THOMPSON, GUERN K.	1971
VANTRUMP, WILLIAM F.	1961
VOLK, VINCENT A.	1955
WALSH, JOHN P.	1958
WRIGHT, LAWRENCE S.	1954

CNST

AUTHOR	DATE
BEDNAR, ERNEST G.	1955
BENJAMIN, NEAL B.	1969
BERGSTROM, PHILIP G.	1970
BICKNELL, WILLIAM C.	1942
BOLLINGER, ELROY W.	1950
BOWERS, VICTOR L.	1941
BRAME, WILLIAM E.	1967
BROEMAER, GARY M.	1968
CASSIMATIS, PETER J.	1967
DOUGLAS, DAVID E	1973
DUFFY, JOSEPH W.	1958
EATON, MERRILL T.	1932
EDSTROM, CARL A	1972
ELLIS, NEIL G.	1966
FOSTER, HOWARD G.	1969
GALLUP, LELLAND L.	1970
GLEASON, WILLIAM E.	1967
HAUENSTEIN, ALBERT D	1966
HAYNES, LUTHER J.	1956
HILDEBRANDT, ROBERT	1973
JARED, ALVA H.	1968
JURALEWICZ, RICHARD	1966
KUWIK, PAUL D.	1970
LLOYD, CLIFFORD J.	1968
MOSS JR, ROGER W	1972
PETER, RICHARD F.	1970
REESER, GEORGE W.	1971
THIEME, EBERHARD	
VANDEBERG, LOYD W.	1955
VANHERCK, DON V.	1966
WAITKUS, LORIN V.	1971
WEST, WILLIAM E.	1969
WHITE, DAVID L.	1973
YOUNG, DARIUS R.	1968

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AUTHOR	DATE
ALKAN, OMER C.	1969
ARNOLD, FRANK J.	1932
ARNOLD, WALTER M.	1957
BARROW, RICHARD W.	1969
BASKIN, SAMUEL	1954
BENJAMIN, GERALD E.	1968
BERGVIN, PAUL E.	1945
BILLINGS, DONN	1953
BLEDSOE, HARRY J.	1968
CHILSON, JOHN S.	1969
COOPER, JACK H.	1961
CRUNKILTON, JOHN R.	1969
DETRICK, RONALD L.	1972
DOBSON, CLIFFORD G.	1956
DRAKE JR, FRANCIS D.	1969
EDDY, EVAN M.	1956
FARAHBAKHSHIAN, EBRA	1967
FETTERMAN, ELKIE R	1966
GALLAGHER, JAMES E.	1970
GELINAS, PAUL J.	1954
GRAY, JAMES A.	1969
HALE, LESTER W.	1967
HAWLK, ROBERT H.	1960
HOLLOWAY, LEWIS D.	1967
HUBER, PAUL M.	1971
IVINS, WILSON H.	1947
JENSEN, THOMAS R.	1968
KOHRAM, GEORGE E.	1952
KU, GEORGE C	1972
LUX, DONALD G.	1955
MALKAN, JEROME M.	1967
MC GINNIS, PATRICK T	1972
MEIERHENRY, WESLEY C	1946
MEISNER, ROBERT G.	1967
MICHELSON, EINO S.	1956
MILLER, CLARENCE M.	1968
MONROE, LYNNE C.	1939
O NEIL, IVOR R.	1972
RILEY, E. C.	1970
ROEDER, JOHN A.	1972
SANDERS, LESTER E.	1967
SAWYER, DAVID E.	1972
SCHENCK, JOHN P.	1969
SHERCK, CHARLES P.	1969
SHIBLER, HERMAN L.	1941
SHORE JR, THOMAS C.	1970
SILVEY, WRAY D.	1950
SMITH, FARMER S.	1969
STORY, CHARLES H.	1970
TODD, JOHN D	1972
TRUDEAU, TERENCE J	1972
TUTTLE, CHESTER D.	1965
WATERSTREET, DONALD	1969
WELCH, FREDERICK G.	1971
WILKINSON, WILLIAM E	1972

COFS

AUTHOR	DATE
AXELROD, AARON	1951
BUXTON, ROBERT E.	1960
DAVIS, WARREN C.	1936
FEIRER, JOHN L.	1946
GOLD, CLARENCE H.	1967
GROSSEL, ROGER L.	1971
HENNIG, JAMES F.	1970
HOLT, JAY F.	1970
ILLINIK, ROBERT L.	1971
INGRAM, MAURICE D.	1971
KAPLAN, HAROLD	1956
KAPLAN, WILLIAM A.	1970
KELLY, MICHAEL V.	1968
KING, THOMAS G.	1958
KLEIN, CHARLES T.	1942
LESTER, SEELIG L.	1944
MAHONEY, JAMES H.	1956
MC KENZIE, CHARLES R	1971
MONTELEONE, THOMAS I	1952
MUNGER, PAUL R.	1972
OLSEN, GEORGE A.	1971
PAINE, HARRY W.	1943
POLETTE, DOUGLAS L.	1972
RUMMELL, WINFIELD R.	1971
SALMON, DANIEL A.	1965
SELLON, WILLIAM A.	1950
SILVIUS, HAROLD G.	1946
SPAULDING, ROLAND H.	1936
THOMAS, HENRY L.	1971
THORNTON, ROBERT W.	1971
TUTHILL, RUSSELL	1970
VOELKNER, ALVIN R.	1970
ZABCIK, CALVIN L.	1969

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AUTHOR	DATE
FULLEN, JAMES D	1973
GRUEN, CLEMENS A	1973
HALES, JAMES A	1972
HAMPTON JR, ISAAC P.	1959
HONEYCUTT, BILLY J	1973
JANSEN, DUANE G.	1972
JASNOSZ, THOMAS A.	1969
JUSSIM, ESTELLE	1970
KAFFER, FRED C.	1941
MILLER, JOHN R.	1970
WAINA, RICHARD B.	1969
ZIEL, HENRY R.	1961

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AUTHOR	DATE
BERGSTROM, PHILIP G.	1970

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AUTHOR	DATE
ADAMS, DEWEY A.	1966
ADAMS, ROBERT W.	1947
BLOCK, MURRAY H.	1953
FURLONG, JOHN	1957
SCHOLES, CHARLES E.	1968
SEAMAN, DON F.	1968
WILLIAMSON, MERRILL	1958
WREN, HAROLD A.	1941

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AUTHOR	DATE
BERGSTROM, HOWARD E.	1965
BOLICK, GERALD M.	1968
BORTZ, WALTER R.	1971
BOTTOMS, JAMES E.	1965
BOVENIZER, ELDRED R.	1968
BRADLEY, HARRY L.	1967
BRINKMAN, FRED J.	1970
CARPENTER, THOMAS E.	1971
CASNER, DANIEL	1950
CHILSON, JOHN S.	1969
CLEVELAND, JOHN M.	1961
CLIFTON, RONALD J.	1970
COMBS, STANLEY L.	1948
CORMACK, ROBERT B.	1970
C COSTA, AYRES G.	1968
DE BORD, ROBERT F.	1972
DODGE, ARTHUR F.	1935
DOERR, JOHN J.	1967
DRAKE, JAMES B.	1972
DUTT, KARL F.	1969
ELLIOTT, BURTON L.	1971
GALLOWAY, JOEL D.	1972
GARBEE, EUGENE E.	1949
GEARING, PHILLIP	1970
HATALSAN, JOHN W.	1963
HELBERG, DONALD H.	1969
HYDE, ELDON K.	1968
HYDE, THOMAS E	1973
JOHNSON, DONALD H.	1966
KEIM, LAWRENCE	1966
KUETEMEYER, VINCENT	1972
LOOSLE, DARRELL K.	1967
MAC DONALD, MANLEY E	1944
MC CALLUM, HARRY N.	1967
MC CLURE, CLOIS A.	
MEIER, MARY A.	1969
MOSLEY, SAMUEL N.	1970
OMAN, RONALD N.	1971
OSORNO, WENDELL A	1972
PASSMORE, JAMES L.	1968
PLATA, MACIMINO	1971
POTTER, DENIS A.	1973
PRUSKI, JOHN	1958
PUGH, DWIGHT A.	1969
REAMS, JAKE W.	1963
RELYEA, GLADYS M.	1937
SAWYER, DAVID E.	1972
SCHELLER, THOMAS G.	1967
SHAW, GERALD H.	1968
SMITH, ROYAL E.	1969
SOLIMAN, ABDALLA M.	1967
SOLTYS, ROBERT G.	1971
STENSON, ORVIS J.	1971
STILLERMAN, MANUEL	1970
THORPE, CLAIBORNE B.	1968
TICHENOR, HAROLD D.	1967
VAN DERSLICE, JOHN F	1967
WERNER, WAYNE E.	1969
WINDLE, JIM L.	1968
WITT, HENERY F.	1971
WOJCIK, JAMES A.	1971
WOOD, GRANT R.	1970
WYNNE, ROBERT L.	1968

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AUTHOR	DATE
ANDERSON, RICHARD B.	1970
BARBER, CARL S.	1967
BASS, RONALD E.	1971
BECK, PAUL A.	1971
BIEKERT, RUSSELL G.	1971
BRUNTLETT, JOHN E.	1973
CAMBELL, CLIFTON P.	1971
CAMPBELL, CLIFTON P.	1971
CASE, MERL E.	1971
CONADIO, BLASE	1969
DUHON, HOWARD	1972
GIERKE, EARL W.	1970
GROSSEL, ROGER L.	1971
GRUMBLING, HENRY M.	1968
HARDING, LARRY G.	1971
HILL, CLAIR S.	1971
HORNBUCKLE, GARY D.	1967
JORDAN, KENNETH F.	1969
KELLY, MICHAEL V.	1968
MEDEIROS, EDWARD J.	1970
NOVOSAD, JOHN P.	1971
PHILLIPS, THOMAS G.	1971
RANDOLPH, JAMES R.	1972
ROSSER, ARTHUR J.	1968
RUMMELL, WINFIELD R.	1971
STILLMAN, NEIL J	1972
TRUDEAU, TERENCE J	1972
UMSTATTD, WILLIAM D.	1970
ZIMMERS, EMORY W	1973

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AUTHOR	DATE
BENSON, KENNETH R.	1956
FISHER, ALLYN J	1972
GARBEE, EUGENE E.	1949
GLISMANN, LEONARD W.	1967
JOHNSON, IRA H.	1955
MOSS JR, ROGER W	1972
OSBURN, BURL N.	1939
RICH, MILDRED K.	1958
ROBBINS, EVELYN G.	1949
SEEHOFF, JESSE	1942
SOLIMAN, ABDEL RAZEK	1970
TRAPANESE, MENNA G.	1964
VANN, LOWELL C.	1970
ZANKOWICH, PAUL	1956
ZIMMERMAN, FRED W.	1957

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AUTHOR	DATE
ALLEN, CAMERON K	1973
BAKER, TIM	1972
CORMACK, ROBERT B.	1970
CUONY, EDWARD R.	1953
DALE JR, SAM E	1972
DENT, JAMES A	1972
HARRISON, DENIST D.	1972
KEPLER, ATLEE C.	1968
KO, JIIN-RONG	1972
MC KENNA, CONSTANCE	1971
MOSHIER, KENNETH D	1973
NOTHDURFT, MARIE E	1972
O NEIL, IVOR R.	1972
POTTER, DENIS A.	1973
POULIN, DONALD A	1972
SCHMIDT, RICHARD W	1971
SUNNARBORG, THOMAS R	1972
TOSH, DONALD J.	1971
WHATLEY, ALICE E.	1967

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AUTHOR	DATE
ADELMAN, FRANK W.	1972
BOYER, CAROLINE K.	1966
BURGETT, DONALD C.	1970
COBURN, JAMES M.	1969
CONFREY, EVAN E	1967
CRAIG JR, WILLIAM L.	1970
DUHON, HOWARD	1972
ENGELBART, LEON P.	1970
GREGG, MURRY C.	1972
GRONEMAN, CHRIS	1950
HARRIS, MARSHALL A	1972
HARRIS, RICHARD	1970
HILL, JOSHUA	1972
HORVATH, WILLIAM	1972
HUNTER, ROBERT F.	1970
INABA, LAWRENCE A.	1970
LEAVITT, MURRAY P.	1970
MALI, PAUL	1966
MARSHALL, CHARLES R.	1971
MARTINEZ, LEONARDO	1972
MC NAMARA, JAMES F.	1970
MEIER, MARY A.	1969
MOORE, BILLY M	1973
MUDZO, MICHAEL G.	1970
NEEDHAM, RAYMOND J.	1969
O HARA, JAMES S	1972
O NEILL, JOHN N.	1971
OGUNNIYI, OMOTOSHO	1969
OLSON, HERBERT A.	1970
OWENS, HILDA F	1973
RAPP, ALFRED V.	1972
SCHWEINFURTH, LUDWIG	1969
SEARS JR, WOODROW H.	1971
SMITH, KENNETH T	1972
TOBIN, GERALD W.	1972
UXER, JOHN E.	1967
VANDER LINDE, ALBERT	1971
WAKS, SHLOMO	1973
WELSH, BARTON W.	1971
WHITE, CHARLIE H	1972
WIGGS, GARLAND D.	1971
WU, JACK	1973

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AUTHOR	DATE
ABROMAITIS, JOSEPH J	1969
ANDERSON, DONALD N.	1963
BABCOCK, JAMES G.	1969
BARLOW, GARY C.	1967
BATES, WILLIAM M.	1969
CANTOR, ROBERT L.	1952
CLAY, KENNETH R.	1965
COLLONS, RODGER D.	1967
CRAFT, CLYDE O.	1967
DUENK, LESTER G.	1966
GARBEE, EUGENE E.	1949
GHEEN, W. LLOYD	1970
GHEEN, WILLIAM L.	1970
HAHN, MARSHALL S.	1967
HANKS, WILLIAM S.	1966
HARNEY, LEON T.	1967
IRVINE, FLEET R.	1968
ISOM, VERNON H.	1970
MAGOWAN, ROBERT E.	1967
MC NEILL, JOSEPH G.	1970
PHILLIPS, KENNETH	1950
RICH, MILDRED K.	1958
SCHUMM, FRED C	1972
SOLIMAN, ABDALLA M.	1967
SOMMERS, WESLEY S.	1961
STELZNER, RAYMOND R.	1969
TUCKER, CASEY A.	1965

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AUTHOR	DATE
EVANS, HARRY L.	1953
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PHILLIPS, KENNETH	1950
SIMMONS, DARRELL D	1958
SWAENGSUGDI, THANOO	1959

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ACKER, JAMES D.	1971

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AMELON, DONALD J.	1969
BALL, CHARLES E.	1958
BENSON, M. J.	1967
CALEY, PAUL C.	1969
DUNFEE, EMERY S.	1964
JOHNSTON, JOHN L.	1956
JOLLY, FRANK H.	1970
LEMASTER, LELAN K.	1961
WORTHINGTON, ROBERT	1958
WRIGHT, WELCOME E.	1953

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AUTHOR	DATE
ABITIA, FREDDIE	1971
ALDEN, RICHARD S.	1971
ATKINS, MICHAEL B.	1971
BAILEY JR, JAMES H.	1961
BARLOW, GARY C.	1967
BAUER, CARLTON E.	1955
BAUGHER, RICHARD W.	1972
BEKTON, WILLIAM E.	1965
COLCLASER JR, ROBERT	1968
DOELLINGER, KEITH E.	1971
FORKNER, WILLIAM R.	1968
GUERARD, MICHAEL P.	1971
HANKS, WILLIAM S.	1966
JOHNSON, ROBERT I.	1958
LENTO, ROBERT	1971
REED, RICHARD L.	1971
STORY, CHARLES H.	1970
TATE, JOHN B.	1971
TUTHILL, RUSSELL	1970
WALSTON, HARRY W.	1970
WEALE, MARY J.	1968
WEHRLI, ROBERT	1968
WHITE, BRUCE H.	1967

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BEACHAM, HERBERT C.	19
BENJAMIN, GERALD E.	1968
BRITT, ROBERT D.	1966
CANDOLI, I. C.	1967
CHEEK, GERALD D	1972
ELMER, FRANCES W.	1967
ENZIAN, HAROLD J.	1967
FARNING, MAX C	1972
FINNEY JR, JOHN D.	1967
GILLILAND, HUGH R.	1967
HILDEBRANDT, ROBERT	1973
JENSEN, THOMAS R.	1968
LOWMAN, CLARENCE L.	1967
MICHIE, JACK	1968
REED, WILLIAM T.	1947
RICH, MILDRED K.	1958
RICHARDS, FREDDIE L	1972
ROBINSON, WILLIAM O.	1971
SEEHOFF, JESSE	1942
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THORNE III, EDWARD H	1972
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BECK, EUGENE J.	1968
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EARLE, JAMES H.	1964

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AUTHOR	DATE
BLEDSOE, HARRY J.	1968
DRAKE JR, FRANCIS O.	1969
HAWLK, ROBERT H.	1960
HILL, CHARLES R.	1950
MEIERHENRY, WESLEY C	1946
MICHELSON, EINO S.	1956
PREITZ, CLARENCE H.	1969
SHIBLER, HERMAN L.	1941
SILVEY, WRAY D.	1950

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AUTHOR	DATE
ABSHIRE, ALLISON J	1972
ATHANASIOU, ROBERT B	1969
BOWSER, JAMES A.	1960
BRILL, DONALD M	1972
CHRISTIAN, JACK B.	1969
CLARK, JAMES V.	1967
FALKENSTINE, JAMES C	1965
FRAZIER, WILLIAM D.	1966
FRYE, RONALD M.	1962
FULLER, JOHN A.	1971
GADBOIS, ROBERT L.	1968
GILBREATH, TOMMY D.	1971
GREANEY, VINCENT M	1973
HANSEN, MAX E.	1964
MARSHALL JR,THOMAS C	1941
MIDILI, JOHN A.	1970
MILLER, AARON J.	1966
MILLER, CLARENCE M.	1968
MOSS, JOHN F.	1962
MUNISTERI, ANTHONY	1971
NEWBURY, DAVID N.	1967
RALSTROM, STIG E.	1969
ROBINSON, CLARENCE L	1972
SILVER, HARVEY A.	1967
STALLINGS, DANIEL N.	1969
STILLERMAN, MANUEL	1970
STROUT, GEORGE M.	1970
WALSH, RAYMOND J.	1965
WHINFIELD, RICHARD W	1969
WHITE, LELAND W.	1966
WIEHE, THEODORE E.	1954

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ALEXANDER, WILLIAM F	1969
ALTUS, DAVID M.	1972
AMTHOR, WILLIAM C.	1967
ARMBRUST, ROBERT W.	1969
ATKINS, MICHAEL B.	1971
BAILEY JR, JAMES H.	1961
BARBER, CARL S.	1967
BARLOW, GARY C.	1967
BASS, RONALD E.	1971
BAUER, CARLTON E.	1955
BAUGHER, RICHARD W.	1972
BECK, BURREL H.	1967
BECK, EUGENE J.	1968
BECK, JOHN R.	1964
BENJAMIN, NEAL B.	1969
BETTENCOURT, WILLIAM	1953
BIEWALD, EDWARD C.	1969
BJORKQUIST, DAVID C.	1965
BLUM, ROBERT E.	1965
BOWMAN, ERNEST L.	1932
BROADHURST, FREDERIC	1969
BROWN, WILLIAM E.	1964
BROWNRIGG, JERRY R.	1962
BURNS, WILLIAM E.	1965
CAMPBELL, GORDON	1969
CASE, MERL E.	1971
CLARK, FRANCIS E.	1971
COLCLASER JR, ROBERT	1968
CRAFT, CLYDE O.	1967
CRAWFORD, JOHN E.	1941
DOELLINGER, KEITH E.	1971
DYKE, EUGENE L.	1962
EARLE, JAMES H.	1964
EIDE. ARVID R	1973
ELLIS, NEIL G.	1966
ERICKSON, RICHARD C.	1966
FLEMING, BRUCE E.	1969
FORKNER, WILLIAM R.	1968
FRANCHAK, STEPHEN J.	1971
FRESCHET, FERUCIO	1969
GIETL, RUDY E.	1971
GLAZENER, EVERETT R.	1958
GROVES, EDWIN D.	1970
GUERARD, MICHAEL P.	1971
GUNDERSON, B. HARRY	1949
HARNEY, LEON T.	1967
HATLEY, JIMMY D.	1969
HEPLER, EARL R.	1957
HERBERTS, ROGER E.	1971
HICKMAN, KEITH F.	1967
HILL, CLAIR S.	1971
HOLT, JAY F.	1970
HORINE, JOHN W.	1961
HUSUNG, WILLIAM T.	1970
IRWIN, JACK L	1973
JACOBSEN, ECKHART A.	1957
KESEMAN, CHARLES E.	1967
KLEHM, WALTER A.	1937
KRANTZ, MATTHEW B.	1970
LEMONS, CLIFTON D.	1965
LEVANDE, JAMES S	1972
LOGUE, JAY L.	1959
LUETKEMEYER, JOSEPH	1961
MAGOWAN, ROBERT E.	1967
MC CAGE, RONALD D.	1970
MC CLURE, CLOIS A.	
MIDDLETON, WILLIAM H	1962
MOEGENBURG, LOUIS A.	1969
MUDGETT, ALBERT G.	1958
MULLER, ERWIN T.	1938
MUNS III, NEDOM C.	1969
NEE, JOHN G	1972
NOLL, ROBERT F.	1967
NORMAN, RALPH P.	1955
NYSTROM, DENNIS C.	1969
PAPP, ALEXANDER G.	19
RANDEL, STEPHEN V.	1957
RAY, J. EDGAR	1944
RICHARDS, MAURICE F.	1950
ROUTH, JERRY D.	1970
ROWLETT, JOHN D.	1960
RYAN, ROBERT D.	1964
SCHANBACHER, EUGENE	1961
SCHWEINFURTH, LUDWIG	1969
SEXTON, WILLIAM E.	1965
SMITH, CARRELL L.	1969
SMITH, FREDDY J.	1970
SMITH, KAY H.	1962
STANFIELD, FOSTER A.	1971
STEGMAN, GEORGE K.	1962
STILLMAN, NEIL J	1972
STORY, CHARLES H.	1970
STREICHLER, JERRY	1963
SUESS, ALAN R.	1962
SULLIVAN, FRANK V.	1964
THATCHER, GLENN M.	1970
TORBETT, DANIEL L.	1965
VESPER, KARL H.	1969
VOLPE, GERALD	1969
WALKER, JOE W.	1970
WALLIS, CARL R.	1969
WALSTON, HARRY W.	1970
WEHRLI, ROBERT	1968
WILKES, DORAN F.	1966
WINEGAR, GARY H.	1969

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AUTHOR	DATE
CRAWSHAW, MARSHALL R	1950
HILDRETH JR, EDDIE	1972
JANZEN, JOHN W.	1971
KAVICH, LAWRENCE L.	1964
LOCKE, LEWIS A.	1969
SONDERMAN, ROBERT B.	1956
WALLACE, NORMAN E.	1968

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AUTHOR	DATE
ADAMS, ROBERT W.	1947
AUER, HERBERT J.	1971
BADER, LOIS	1932
BAKER, GLENN E.	1966
BERGMAN, KENNETH H.	1963
BRENNER, CHARLES J.	1968
BRILL, DONALD M	1972
BROE, JOHN R.	1962
BROWN III, ALPHA O.	1971
BROWN, JAMES T	1973
BROWN, GEORGE J.	1960
BRUDZYNSKI, ALFRED J	1966
DAS, RADHA C.	1950
DECK, WILLIAM L.	1955
DRISCOLL, EDWARD F	1964
DUKES, GLENN F.	1969
DUNFEE, EMERY S.	1964
FARR, WILBUR J.	1958
FOLEY JR, JOHN P.	1968
FOWLER, RICHARD J.	1965
FRANCIS, GEORGE H.	1966
GARNER, CAREY C.	1969
GERNE JR, TIMOTHY A.	1967
GILLIE SR, ANGELO C.	1967
GOLDBERG, JOEL	1971
HAMPTON JR, ISAAC P.	1959
HANCOX, FREDERICK J.	1969
HARMON, JAMES S.	1969
HERRING, TOD H.	1962
HILL, EDWIN K.	1968
HOBBS, ADDISON S.	1971
HOFER, JARREL	1969
HOLMAN, MARSHALL G	1972
INABA, LAWRENCE A.	1970
INGRAM, MAURICE D.	1971
JELDEN, DAVID L.	1960
JELDEN, DAVID L.	1971
JOHNSON, DOUGLAS H.	1969
JOHNSON, FRANK F.	1971
JOHNSTON, JOHN L.	1956
KAPLAN, HAROLD	1956
KAVANAUGH, WILLIAM A	1955
KEMELGOR, BRUCE H	1973
KLEIMAN, HERBERT S.	1966
KOUTNIK, PAUL G.	1968
LARSON, IRVING W.	1969
LEASE, ALFRED A.	1964
LEVENSON, WILLIAM B.	1937
LUDLOW, GERALD C	1973
LUNDY, LYNDALL L.	1968
LYONS, RICHARD A.	1969
MANESS, MARION T.	1969
MARCINOWSKI, MARY E.	1971
METZLER, JOHN H.	1970
MILLER, DAVID H.	1971
MILLS, BOYD C.	1967
MORGAN SR, LEO D.	1966
MUSGROVE, WILLIAM R.	19
NICKERSON, PAUL S.	1947
OHLSON, ELI E.	1943
PANKOWSKI, DALLAS J.	1966
PEARSON, WILLIAM W.	1967
PEITHMAN, ROSCOE E.	1955
PERKINS, LAWRENCE H.	1967
PITTMAN, FRANK M.	1970
PRATZNER, FRANK C.	1969
PREWITT, ROGER W	1973
RAICHLE, HENRY F.	1969
RICHARDS, FREDDIE L	1972
RICKER, PHILLIP E.	1965
RIGBY, WILLIAM H	1972
RUEHL, PHILIP W.	1961
RUITER, WILLIAM W.	1971
RUSSELL JR, JAMES A.	1967
SCHULER, CHARLES A.	1966
SEIGLER, CLAUDE I.	1970
SEGUIN, ARMAND M	1973
SHIGETOMI, SAMSON S.	1970
SIMONS, JEROLD J.	1967
SKOUBY, ERIC W	1972
SLATTER, JOHN B.	1970
SMITH, BRANDON B.	1968
SORENSEN, RONALD L.	1964
STIEGLER, LAIRD B.	1971
STILLERMAN, MANUEL	1970
TEEL, DEAN A.	1967
TREGO, JOHN W.	1958
TURNER, ROBERT E.	1957
VASEK, RICHARD J.	1967
VOGEL, RICHARD F.	1968
WASHBURN, KENNETH R.	1971
WEEDE, GARY D.	1967
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WILSON, RUSSELL C.	1971
WRIGHT, JERAULD B.	1969
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AUTHOR	DATE
BAUGRUD, KIM J.	1968
BICKNELL, WILLIAM C.	1942
BJORKQUIST, DAVID C.	1965
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BROWN, ROBERT D.	1955
BRUCE, PHILLIP L.	1964
BRUDZYNSKI, ALFRED J	1966
CHAMBERLAIN, DUANE G	1954
CHAMPION, GEORGE	1965
CHRISTISON, CHESTER	1973
DOANE, RAYMOND C.	1956
DOUTT, RICHARD F.	1965
DOWNS, WILLIAM A.	1968
DUNCAN, GLENN S.	1950
FAGAN, RAYMOND E. B.	1954
GERNE JR, TIMOTHY A.	1967
GILBERT, HAROLD G.	1955
GOFF, WILLIAM H.	1967
GRANTHAM, LAWRENCE B	1972
GRIFFIN, RAYMOND V.	1965
GUNTHER, THERESA C.	1931
HANSEN, RUSSELL G.	1964
HAWS, ROBERT W.	1947
HERRICK, IRVING W.	1969
HORBAKE, R. LEE	1942
HORNBLAKE, R. LEE	1939
HURLEY, CARL E.	1971
INABA, LAWRENCE A.	1970
INGRAM, FRANKLIN C.	1966
JOHNSON, ROBERT I.	1958
KIRKWOOD, JAMES J.	1970
KOHLER, RICHARD C.	1951
KROH, DAMON K	1957
KRUMBIEGEL, WALTER O	1955
LJOSTAD, RODNEY A.	1965
LLOYD, CLIFFORD J.	1968
LOATS, HENRY A.	1950

LOPEZ, DANIEL C.	19
LOW, FRED G.	1963
PAINE, CLIVE	1930
PALOW, WILLIAM P.	1969
PEEL, NANCY D.	1967
PERSHERN, FRANK R.	1967
POWER, ANDREW T.	1955
RICHARDS, KENVYN B.	1970
ROBINSON, FRANK E.	1955
SCOBEY, MARY-MARGARE	
SQUIBB, ALBERT R.	1967
SWERDLOW, ROBERT M.	1969
THIEME, EBERHARD	1965
TRAPANESE, MENNA G.	1964
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WILLIAMS III, WALTER	1963

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AKHUN, ILHAN I.	1961
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ALTUS, DAVID M.	1972
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BOONE, JAMES L.	1966
BRACEY, HYLER J.	1969
BRADSHAW, OTTIE L.	1968
BRAUN, ROBERT W.	1971
BROTHERTON, WILLIAM	1964
CHAPMAN, GEORGE L	1972
CLAUSEN, JOHN N.	1955
COLCLASER JR, ROBERT	1968
COLE, DARRELL D	1972
DAVID, WILLIAM J.	1968
DEAN, C. THOMAS	1951
DUNLAP, EUGENE W.	1962
DYKE, EUGENE L.	1962
ELKINS, RICHARD L	1972
ELLIOTT, EARL S.	1967
FOSTER, ROBERT J.	1969
GARNER, CAREY C.	1969
GROSS, ANDREW C.	1968
GROVES, EDWIN D.	1970
HANSEN, MAX E.	1964
HEPLER, EARL R.	1957
HOLT, JAY F.	1970
HUNT, DE WITT T.	1939
HUNTER, ROBERT F.	1970
JOHNSTON, WALLACE L.	1968
KANTER, STUART A.	1968
KRUBECK, FLOYD E.	1954
LAUBENTHAL, CRAIG D.	1969
LEMONS, CLIFTON D.	1965
LOGUE, JAY L.	1959
MALI, PAUL	1966
MANGANELLI, FRED D.	1959
MC DOUGLE, LARRY G.	1971
MILLER, AARON J.	1966
MUDGETT, ALBERT G.	1958
O BRYANT, DAVID C.	1970
O CONNELL, JOHN F.	1971
RANDEL, STEPHEN V.	1957
RAY, REX E.	1966
RICHARDS, MAURICE F.	1950
RINEHART, RICHARD L.	1966
ROTHMAN, ROBERT A.	1969
RUTEN, WILLIAM H.	1953
RYAN, ROBERT D.	1964
SCHWEINFURTH, LUDWIG	1969
SONNER, JAN R.	1972
STAMM, HAROLD S.	1968
STEGMAN, GEORGE K.	1962
STORY, CHARLES H.	1970
STUART, WILLIAM R.	1972
TERRY, THOMAS P.	1972
TRAMBLEY, JOHN B.	1969
VAN DERSLICE, JOHN F	1967

VESPER, KARL H.	1969
WAINA, RICHARD B.	1969
WAKS, SHLOMO	1973
WALLACE, DONALD F	1972
WATERSTREET, DONALD	1969
WIEHE, THEODORE E.	1954
WU, JACK	1973

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CANDOLI, I. C.	1967
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PONTYNEN, BURTON A	1973
SUMTER, PAUL E.	1969
YUNG, JOHN E.	1965

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BUNTEN, CHARLES A.	1955
CUNNINGHAM, BERYL M.	1952
DOUTT, RICHARD F.	1965
ENVICK, DONALD D.	1968
ERICKSON, JOHN H.	1953
FROESE, RICHARD A	1972
HICKS, CAROL E	1973
HUMBLE, MILFORD K.	1937
KLEHM, WALTER A.	1937
MC ARTHUR, ROSS J.	1955
MC GAW, SIDNEY E.	1952
MILLER, JOHN G.	1954
MILLER, THOMAS W.	1958
ROSS, RAYMOND J.	1966
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ALLEN, WILSON S.	1936
BEACHAM, HERBERT C.	19
CHAVOUS, ARTHUR M.	1945
COTTON, GEORGE R.	1944
CURTIS, BYRON W.	1968
ENCK, HENRY S.	1970
FINNEY JR, JOHN D.	1967
GILLILAND, HUGH R.	1967
HAIGWOOD, THOMAS L.	1959
HALL, CLYDE W.	1953
HARRISON, ELTON C.	1948
HILLSMAN, SALLY	1970
JACKSON, THOMAS A.	1962
MILLER, WAYNE E.	1969
NASH, MC KINLEY M.	1972
O BRYANT, DAVID C.	1970
PHILLIPS, AUGUSTUS C	1941
PRITCHARD, MIRIAM C.	1937
REED, WILLIAM T.	1947
STUART, IRVING R.	1951
TAYLOR, CYRUS B.	1955
TURNER, ALFRED B.	1941
TURNER, BRIDGES A.	1941
WOODEN, RALPH L.	1956

EVFA

AUTHOR	DATE
ANDREYKA, ROBERT E.	1969
ARNOLD, DANIEL S.	1968
BURKERT, WILLIAM G.	1970
CAIN, JOHN N.	1970
CLABAUGH, RICHARD D.	1971
DOUCETTE, RUSSELL J.	1972
DRAKE, JAMES B.	1972
EHRENBORG, JOHN D.	1963
ENSMAN, LEO M.	1957
FAHRLANDER, DANIEL C	1973
FORREST JR, LEWIS C.	1970
FRAGALE, MARVIN J.	1969
GIANINI, PAUL C.	1968
GUNDERSON, ORLEY D.	1971
HAGEN, DONALD L.	1972
HAMMACK, CHARLES R.	1967
HOLMEN, HOLGER E.	1969
JAMES, WILLIAM E.	1971
KUEHL, HENRY W	1972
LANGFORD JR, HARRY E	1973
LARSON, MILTON E.	1965
LINDAHL, DONALD G.	1971
LOEPP, FRANZIE L.	1970
LUDLOW, GERALD C	1973
MAW, JAMES L.	1971
MC KEE, RONALD R.	1971
MC LONEY WIRT L.	1965
MEYER, JOHN D.	1970
MILAN, JOSEPH E	1972
MILLER, JACK D.	1971
MILLER, MARY D	1971
MUELLER, DENNIS L	1972
NEASHAM, ERNEST R.	1968
ODBERT, JOHN T.	1973
OLIVER, WILMOT F.	1967
OLSON, RICHARD R.	1971
OPPELT, MARION O.	1967
OSORNO, WENDELL A	1972
RIGGS, DONALD D.	1971
RUDISILL, ALVIN E.	1969
SCHMITT, CARLOS R.	1971
SPAULDING, LLOYD F.	1971
STANGL, OTTO A.	1968
STEPHENSON, LESLIE E	1958
SUTTON, FRED C.	1961
TERRY, THOMAS P.	1972
TOLLEY, CHARLES H.	1969
WALLS, W. DALE	1964
WATKINS, KENNETH E.	1966
WILLIAMS III, WALTER	1963
WITT, HENERY F.	1971
WOODY JR, EARL T.	1963

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AUTHOR	DATE
ANDERSON, EDWARD T.	1970
BAUGRUD, KIM J.	1968
BEDWELL, NORMAN W.	1951
BENDER, MICHAEL	1971
BENJAMIN, GERALD E.	1968
BLACK, DONALD E.	1970
BLAND, LARSON M.	1972
BURRIS, WAITUS R.	1967
CLARK, JAMES V.	1967
DAVIS, EDDIE M.	1971
DOANE, RAYMOND C.	1956
DRENNAN, JERRY D.	1970
ELMER, FRANCES W.	1967
FINDLEY, WILLIAM L.	1967
FRAZIER, WILLIAM D.	1966
GALLOWAY, JOEL D.	1972
GILL, ROY C.	1972
GLENN, JOHN W.	1966
GLISMANN, LEONARD W.	1967
GROVES, RAMSEY M.	1966
HAGEN, DONALD L.	1972
HALLAHAN, MICHAEL F.	1969
HILDEBRANDT, ROBERT	1973
HOLLINSHEAD, MERRILL	1952
JACKMAN, DUANE A.	1961
JAGEMAN, LARRY W.	1968
JENSEN, THOMAS R.	1968
LOVELESS, AUSTIN G.	1962
LUY, JACK A.	1964
MANNION, EDMUND J.	1972
MOORE, ALFRED H.	1954
NILSON, KENNETH	1931
NOTHDURFT, MARIE E	1972
O BRYANT, DAVID C.	1970
OAKS, MERRILL M.	1970
OLSON, DAVID D.	1969
PRITCHARD, MIRIAM C.	1937
RICH, MILDRED K.	1958
RICHARDS, FREDDIE L	1972
ROSS, HERBERT J.	1970
SEEHOFF, JESSE	1942
TURECHEK, ARMIN G.	1967
WENTZ, CHARLES H.	1969
WILBUR, LOUISE	1931
WILLIAMS, MICHAEL	1970
WOLLINGTON, JAMES M.	1966

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AUTHOR	DATE
JACKSON, PETER A.	1965
KIMBALL, KENNETH R.	1967
MAYS, WILLIAM A.	1954

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AUTHOR	DATE
ASHCRAFT, NORMAN C.	1968
BATESON, WILLARD M.	1954
BESTOR, ROLLIE R.	1969
BOLLINGER, ELROY W.	1950
BROWN, GEORGE J.	1960
CHRISTIAN, JACK B.	1969
DEAN, ERNEST D.	1968
DITLOW, GEORGE H.	1956
DOUCETTE, RUSSELL J.	1972
ENGLISH, ROBERT W.	1950
FINCH, CURTIS R.	1969
GRADWELL, JOHN B.	1971
HANSEN, RICHARD H.	1967
HICKS, CAROL E	1973
KELLY, WILLIAM T.	1966
KIST, KEVIN W.	1970
KLEHM, WALTER A.	1937
MARTIN, DONALD H.	1971
MC GAW, SIDNEY E.	1952
MONROE, ALLEN L.	1970
MOON, DONALD E.	1968
MORRISEY, THOMAS J.	1965
PAGE, CHARLES B.	1953
PERKINS, NEAL B.	1962
ROSS, RAYMOND J.	1966
RUDISILL, ALVIN E.	1969
SCHMIDT JR, FRED J.	1941
SHELL, LON R.	1971
SMITH, IRVING G.	1969
STANGL, OTTO A.	1968
TRAPANESE, MENNA G.	1964
UXER, JOHN E.	1967
VAN DYKE, ARVIC W.	1970
VOLPE, GERALD	1969
WINEGAR, GARY H.	1969
WORTHINGTON, KENT L.	1967

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CONROY JR, WILLIAM G	1969
TOLLEY, CHARLES H.	1969

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AUSTIN, ROBERT T.	1964
BARLOW, GENE A.	1971
BASKIN, SAMUEL	1954
BASS, WILBUR A.	1967
BRITT, ROBERT D.	1966
CROUCH, J. PAGE	1968
DALTON, FRANCIS W.	1937
DANAHER, EUGENE I.	1946
DYKEHOUSE, JAY	1950
ELLIS, MARY L.	1970
FORBES, ROY H.	1970
FORKNER, HAMDEN L.	1939
GILBERT, PAUL S.	1972
GILMAN, ROBERT A.	1969
GLAU, JON E.	1970
GRELL, DARRELL D.	1967
GRUBER, HERBERT H.	1942
HANSEN, GARY B.	1971
HARRISON JR, RUSSELL	1971
HUNTER, ELVIN M.	1963
IACOBELLI, JOHN L.	1969
JOCHEN, ALBERT E.	1947
JUANG, HWAI-I	1972
KING, HOMER P.	1934
KOEHLER, MYRON	1972
LANGDON, CHARLES W.	1967
LIGHT, KENNETH F.	1967
MATTSON, HOMER A.	1970
MC NAMARA, JAMES F.	1970
MEISNER, ROBERT G.	1967
MONEY, HOMER E.	1956
MORGAN JR, ALFRED C.	1967
MORGAN, JACK W.	1951
NEFF, WILLIAM L.	1941
PATTERSON JR, PHILIP	1968
PENN, THOMAS L.	1968
PIERCE, WILLIAM F.	1967
PRATT, ARDEN L.	1968
SWAENGSUGDI, THANOO	1959
TAYLOR, FRANK C.	1970
VANDER LINDE, ALBERT	1971
VANDERWELL, ALLEN R.	1971
VANDIVER, ROBERT E.	1968

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AUTHOR	DATE
CHRISMAN, JOSEPH P.	1970
CUSHING, NELSON N.	1971
DENNISON, BOBBY	1970
GRUEN, CLEMENS A	1973
HAILES, CHARLES W.	1971
KRUPPA, JOHN R.	1968
LEMASTER, LELAN K.	1961
LUNDY, LYNDALL L.	1968
NEWTON, ROBERT E.	1970
RICHARDS, THOMAS A	1972
SCHOESLER, RONALD D.	1971
SOMMER, SEYMOUR A.	1971
THATCHER, GLENN M.	1970
WILKES, DORAN F.	1966
WOLFE, JAMES M.	1970

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AUTHOR	DATE
ALDRICH III, DANIEL	1972
ALDRICH, TERRY M.	1969
ANDERSON, ERNEST F.	1966
ARORA, MEHAR C	1973
BARLOW, GENE A.	1971
BARRINGER, DEAN	1971
BENJAMIN, NEAL B.	1969
BONNER, HAROLD S	1972
BUNTEN, CHARLES A.	1955
BURGETT, DONALD C.	1970
CAGE, BOBBY N.	1968
CHUMBLEY, JOHN D	1972
COATES, NORMAN	1967
CORAZZINI, ARTHUR J.	1967
CORFIAS, JOHN C.	1967
DURANA, INES	1972
EPSTEIN, JACK H.	1971
FINDLEY, WILLIAM L.	1967
FORGEY, GEORGE W.	1971
FOWLER, HARMON R.	1970
GARNER, MELVIN H	1972
GARRETT, ARTHUR M.	1971
GIBSON, CHARLES H.	1968
GOISHI, FRANK H.	1970
GRAMBERG, MERLYN L.	1971
GRUBER, HERBERT H.	1942
HANSEN, JOHN R.	1970
HARRIS, JAMES G.	1970
HARRIS, MARSHALL A	1972
HEATH, JAMES L.	1967
HEINSOHN, MARVIN E	1973
JOHNSON, RAYMOND C.	1971
JURKOWITZ, EUGENE L.	1968
KOCH, NORBERT	1951
LOVELESS, AUSTIN G.	1962
LYMAN, JAY R	1972
MC NAMARA, JAMES F.	1970
MILLER, JOHN G.	1954
OLSEN, EUGENE A.	1968
PARKES, GEORGE H.	1939
PARKS, GERALD A.	1969
PARRY, ERNEST B.	1968
PATTERSON JR, PHILIP	1968
PENDEREC, NORMAN C.	1951
PENN, THOMAS L.	1968
POWELL, PAUL E.	1954
RAICHLE, HENRY F.	1969
RICHARDSON, WILLIAM	1972
ROBERTSON, LYLE R.	1968
SHELTON, JOHN A.	1968
SLATTERY, RAYMOND A.	1969
SORENSON, WARREN W	1972
ZWEIBEL, MALCOLM C.	1968

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AUTHOR	DATE
GUENTZLER, WILLIAM D	1973
HOGHAUG, HAROLD T.	1971
MUNGER, PAUL R.	1972
WEATHERS, RICHARD D	1972
WOLANSKY, WILLIAM D.	1968

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AUTHOR	DATE
ABDULLABI, BAKRI	1971
AKHUN, ILHAN I.	1961
AL-BUKHARI, NAJATI M	1968
ALAKI, MADANI A.	1972
ALKAN, OMER C.	1969
ARMSTRONG, JAMES A.	1968
AUSTIN, ROBERT T.	1964
BLECKMAN, JUDITH C.	1971
BOHN, RALPH C.	1957
BRAUN, CHARLES A.	1970
BRILEY, FRANK E.	1967
BURROUGHS, ORVAL N	1972
CHARCUNCHAI, RUANG	1963
CHRISTENSEN, JAMES E	1972
COATES, NORMAN	1967
DANIELS, BLAIR E.	1937
DINGMAN, ERWIN	1949
EDSTROM, CARL A	1972
EVANS, HARRY L.	1953
FARAHBAKHSHIAN, EBRA	1967
FISHER, ALLYN J	1972
GILMAN, ROBERT A.	1969
GREANEY, VINCENT M	1973
HANSEN, GARY B.	1971
HANSSON, KENNETH S.	1966
HARRIS, SUE A.	1970
HARVEY, DAVID W	1971
HOLTROP, WILLIAM F.	1948
HOSLER, FRED W.	1938
ILLINIK, ROBERT L.	1971
ILYAS, MUHAMMAD	1970
INDRESANO, JOSEPH P	1973
IQBAL, MOHAMAD	1972
JABBARI, EBRAHIM G	1972
KHOSHZAMIR, FIROUZ	1971
KINI, KULAI H.	1933
KOO, PO-YEN	1968
KRAFT, RICHARD H.	1967
LEE, MOON Y	1972
MAGENDZO, ABRAHAM	1969
MARTINEZ, LEONARDO	1972
MC ELHENY, JOHN R.	1960
MOHEE, N. F.	1968
NEE, NELSEN V.	1971
NIHAN, GEORGES L	1973
ROBINSON, JAMES W.	1967
RONODIDIJOJO, SOEWAN	1968
SADA, PABLO M.	1971
SHANTHAMALLAPPA, B.	1950
SHARMA, BALDEV R.	1967
SOLIMAN, ABDEL RAZEK	1970
STRUCK, JOHN W.	1956
STUART, HARLAND	1933
SWAENGSUGDI, THANOO	1959
TAYLOR, FRANK C.	1970
URGELL, FRANCISCO C.	1941
USDANE, WILLIAM M.	1955
VYAS, PREMILA H.	1967
WARDWELL, WAYNE D.	1950
WIJEYEWARDENE, JALUT	1960
ZAREISN, SOLEIMAN	1969

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AUTHOR	DATE
HASH, JOHN A.	1969

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AUTHOR	DATE
ADAMS, MAYNARD F.	1971
AKHUN, ILHAN I.	1961
ANDRE, NEVIN E.	1964
BAILEY, DONALD A.	1970
BAKER, TIM	1972
BALLO, GARY R.	1971
BEDWELL, NORMAN W.	1951
BENJAMIN, GERALD E.	1968
BENSMAN, CHARLES J.	1969
BETTIS, GLENN E.	1973
BOSTROM, EDWIN O.	1971
BOTSFORD, JON F.	1972
BOWSER, JAMES A.	1960
BRIGHAM, ELDEN L.	1950
BRILL, DONALD M	1972
BROWDER, LARRY W	1972
BROWN, B. WESLEY	1960
BURRIS, WAITUS R.	1967
CARRERAS, EMANUEL	1972
CHAPMAN, GEORGE L	1972
COX, STEVEN G.	1968
DARM, ADAM E.	1971
DAVIDSON, JOHN E.	1968
ERWIN, WILLIAM R.	1963
FINDLEY, WILLIAM L.	1967
FRYE, RONALD M.	1962
FULLER, FOSTER D.	
FULLER, JOHN A.	1971
GARNER, CAREY C.	1969
GOSS, ANTHONY J	1972
GREANEY, VINCENT M	1973
GRELL, DARRELL D.	1967
GROSS, ANDREW C.	1968
HAKANSON, JOHN W.	1967
HALES, JAMES A	1972
HATALSAN, JOHN W.	1963
HEIN, EDWARD C.	1969
HEMLER, HERMAN T.	1972
HILL, FREDERICK W.	1942
HOLMES, LONNIE A.	1971
HORINE, JOHN W.	1961
HOWE, TREVOR G.	1963
JARVIS, JOHN A.	1953
JOHNSON, CARL R	1972
JOHNSON, THOMAS P.	1967
KEIL, RAYMOND L.	1966
KIEFER, CHARLES C	1972
KLATT, LAWRENCE A.	1967
KRAFT, RICHARD H.	1967
LEAVITT, MAX V	1972
LEMLEY, JOE W.	1970
LEONARD, REGIS L.	1950
LINDAU, ORA F.	1968
LOGUE, JAY L.	1959
MALKAN, JEROME M.	1967
MATTESON, GERALD R.	1966
MC CALLUM, HARRY N.	1967
MICHIE, JACK	1968
MILAM, THOMAS R.	1968
MILAN, JOSEPH E	1972
MORELAND JR, HENRY C	1970
MOSS, JOHN F.	1962
NELSON, A. FRANK	1955
O BRYANT, DAVID C.	1970
PAUTLER, ALBERT J.	1967
PLUSCH, JAMES O.	1967
QUICK, OTHO J.	1954
RAMP, WAYNE S.	1956
ROBERTS, EDWARD R.	1971
ROBINSON, CLARENCE L	1972
ROBINSON, ORIN R.	1965
SHACKELFORD, RICHARD	
SONNER, JAN R.	1972

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AUTHOR	DATE
SPENCER, ALBERT G.	1969
STROUT, GEORGE M.	1970
SUNDIN, ROBERT L.	1971
TOSH, DONALD J.	1971
TROOBOFF, BENJAMIN M	1968
TUTTLE, CHESTER D.	1965
VAN ETTEN, MARVIN D	1972
VOLK, VINCENT A.	1955
WALL, EDWARD R	1972
WALLS, W. DALE	1964
WATKINS, KENNETH E.	1966
WELSH, DONALD J.	1968
WEST, WILLIAM E.	1969
WHEELER, DAVID N	1972
WHITE, ALVIN M.	1958
WIED, ALEXANDER F.	1972
WIEHE, THEODORE E.	1954
WILLIAMS, MICHAEL	1970
WILSON, WADE	1954
WYSOCK, RAYMOND A.	1972
ZANE, LAWRENCE F.	1968

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AUTHOR	DATE
BAILEY, GERALD D.	1964
BRILEY, FRANK E.	1967
HAUSER, ROGER E.	1971
LITTLE, RICHARD L.	1968

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AUTHOR	DATE
GERBER, RUSSELL L.	1966
KAISER, HAROLD F.	1968
NEUBAUER, GERHARDT W	1956
SCHENCK, JOHN P.	1969

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AUTHOR	DATE
CUNICO, GERALD E	1973

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AUTHOR	DATE
ACKER, JAMES D.	1971
ARBELO-ATILES, RAFAE	1972
BAKER, GLENN S.	1968
BANZHAF, ROBERT A	1972
BARRINGER, DEAN	1971
BEARDEN, WILLIAM W.	1967
BERRY, JAMES W.	1972
BLISS, WILLIAM H.	1953
BRASTED, F. KENNETH	1953
BUDKE, WESLEY E.	1970
BURTON, JOHN R	1970
CANDOLI, I. C.	1967
COHEN, CHESTER G.	1970
COMBS, STANLEY L.	1948
CRAWFORD JR, BRYANT	1961
DANOVITZ, SAUL	1957
DAVIS, EDDIE M.	1971
DITTENHAFER, CLARENC	1972
DOLEZAL, WILMA M.	1968
EATON, MERRILL T.	1932
ENGELBREKTSON, SUNE	1961
EVANS, WILSON A.	1954
FAGAN, RAYMOND E. B.	1954
FALES, ROY G.	1948
FARR, WILBUR J.	1958
FULLEN, JAMES D	1973
GEARING, PHILLIP	1970
GILBREATH, TOMMY D.	1971
GILLILAND SR, LONNIE	1955
GLENN, JOHN W.	1966
GRONEMAN, CHRIS	1950
HALL, CLARENCE E.	1969
HANSSON, KENNETH S.	1966
HAWKINS, LESLIE V.	1953
HAWLK, ROBERT H.	1960
HEEP, RICHARD H.	1939
HEMLER, HERMAN T.	1972
HENDRIX, SAMUEL D.	1942
JACKSON, ROSS P.	1967
JACOBSEN, JAMES H.	1964
JENKINS, FARRELL T.	1969
JOHNSON, CARL R	1972
JOHNSTON, KENNETH G.	1966
JORDAN, THOMAS F.	1942
JUANG, HWAI-I	1972
KEENER, CLYDE	1959
KIMBALL, KENNETH R.	1967
KJOS, OSCAR E.	1954
KOCH JR, CARL	1972
KRAFT, RICHARD H.	1967
LACROIX, WILLIAM J.	1971
LINTON, JOHN A.	1951
LOWENSTEIN, NORMAN	1955
LUDINGTON, JOHN R.	1940
MADDOX, MARION E.	1951
MASSEY, HAL	1965
MAXCY, ELLIS O.	1941
MAYS, WILLIAM A.	1954
MC KENZIE, CHARLES R	1971
MC VICKER, HOWARD E.	1970
MILLER, WAYNE E.	1969
MONROE, LYNNE C.	1939
MORGAN JR, ALFRED D.	1967
MOULLETTE, JOHN B.	1970
NESWICK, LAWRENCE G.	1971
O HARA, JAMES S	1972
OAKLEY, GARY D.	1970
OHLSON, ELI E.	1943
PODVIA, M. WAYNE	1972
POELZER, IRENE A	1972
PUGH, DWIGHT A.	1969
QUICK, OTHO J.	1954
REIMER, MILTON K.	1968
ROBERTS, NORMAN N.	1967
RUDIGER, ELMER R.	1952
SCHMITT, VICTOR A.	1953
SCHOLES, CHARLES E.	1968
SEAMAN, DON F.	1968
SEDGWICK, LORRY K.	1965
SHUNN, DONALD W	1972
SPEER, HUGH W.	1950
SPENCER, ALBERT G.	1969
STEPHENS, ROBERT L.	1969
STUTEVILLE, CLAUDE E	1971
TATE, JOEL C	1972
TATUM JR, JULIAN P.	1967
THOMAS JR, WADE F.	1957
THORPE, CLAIBURNE B.	1968
TILLEY, TRUMAN E.	1945
VERMEULEN, ROBERT	1968
WALSH, RAYMOND J.	1965
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WILLIS, GEORGE E.	1972
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AUTHOR	DATE
BORRI, ROBERT	1942
CALLAWAY, ROLAND L.	1953
CROWDER, GENE A.	1968
DECKER, HOWARD S.	1953
ERICKSON, JOHN H.	1953
KLEINBACH, MERLIN H.	1959
MARCH, BRYCE D.	1961
MC MURRY, JAMES G.	1964
MILLER, JOHN G.	1954
MILLER, THOMAS W.	1958
MILLER, WILBUR R.	1960
MITCHELL, JOHN	1954
REMICK, EDWARD L.	
THOMPSON, ROBERT L.	1947
VAN TASSEL, RAYMOND	1948
ZIMMERMAN, FRED W.	1957

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AUTHOR	DATE
ADELMAN, FRANK W.	1972
BALDWIN, THOMAS R.	1971
BETTIS, GLENN E.	1973
DEVLIN, LEON G.	1971
FEIRER, JOHN L.	1946
GIMBEL, ARMIN F.	1953
HENRY, GEORGE F.	1954
MORELAND JR, HENRY C	1970
PERSHING, REX W.	1970
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WIGEN, RAY A.	1957

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AUTHOR	DATE
ARONSON, NORMA	1967
BANZHAF, ROBERT A	1972
BASS, RONALD E.	1971
BROWN, GEORGE C.	1963
CARLSEN, DARVEY E.	1961
CHERRY, ROGER W	1972
COX, ROBERT L.	1970
CRAFT, CLYDE O.	1967
DE VORE, PAUL W.	1961
DEADY, JOHN J.	1970
EVERETT, GEORGE A.	1972
FECIK, JOHN T.	1970
FRANTZ JR, NEVIN R.	1967
FUEG, HENRY L.	1971
GLOGOVSKY, RONALD J.	1970
GRAY, THOMAS E.	1970
GRUEN, CLEMENS A	1973
GYSLER, RANDOLPH L.	1971
HERBERTS, ROGER E.	1971
HERR, JAMES F.	1970
HOLT, JAY F.	1970
HOOTS JR, WILLIAM R.	1966
HORNBUCKLE, GARY D.	1967
JASNOSZ, THOMAS A.	1969
JENKINS, JOHN D.	1969
KEMP, WILLIAM H.	1966
MC CAGE, RONALD D.	1970
MELINE, CHARLES W.	1965
MOREHEAD, JAMES C.	1971
MORRILL, DAVID	1970
MOSS JR. JEROME	1960
NEE, JOHN G	1972
NICHOLS, DWIGHT W.	1955
NYSTROM, DENNIS C.	1969
PRUST, ZENAS A.	1964
PUFAHL, VIRGIL R.	1969
RAYFORD, ERWIN W.	1967
REED, RICHARD L.	1971
RICE, CHARLES M. M.	1958
RIETH, CLAUDE E.	1966
SCHOESLER, RONALD D.	1971
SCHWEINFURTH, LUDWIG	1969
SEDGWICK, LORRY K.	1965
SMITH, KENNETH T	1972
STEGMAN, GEORGE K.	1962
STRANDBERG, C. E.	1963
SULLIVAN, FRANK V.	1964
WEIR, THOMAS S.	1955
WILSON, MICHAEL C.	1969
WOLFE, JAMES M.	1970
WOODRUFF, JAMES N.	1971
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AUTHOR	DATE
ABROMAITIS, JOSEPH J	1969
AGNOR, HERBERT E.	1970
AUCKER, JOHN R.	1970
BAILEY, LARRY J.	1968
BEHM, HARLEY D.	1967
BENSON, WILLARD A.	1959
BING, KENNETH L.	1941
BLACK, RICHARD W.	1973
BLEDSOE, HARRY J.	1968
BLUM, ROBERT E.	1965
BOONE, JAMES L.	1966
BORTZ, WALTER R.	1971
BRIGHAM, ELDEN L.	1950
BRINKMAN, FRED J.	1970
BROWN, WILLIAM E.	1964
BURNS, WILLIAM E.	1965
CLAUSEN, JOHN N.	1955
CLENDENNING, LEE R.	1972
CLEVELAND, JOHN M.	1961
CLIFTON, RONALD J.	1970
CONLEY, FRANKLIN	1968
CRAWFORD, JOHN E.	1941
DEAN, C. THOMAS	1951
DENSLEY, KENNETH G.	1967
DIRKSEN, DENNIS A.	1969
DRAKE, LAWRENCE C.	1966
DRAWDY, LARRY A.	1971
DUNHAM, PHIL R.	1970
DYKE, EUGENE L.	1962
EHRENBORG, JOHN D.	1963
ELLIOTT, BURTON L.	1971
ENSMAN, LEO M.	1957
FEATHER, DON B.	1949
FINKRAL, KEITH C	1972
GIACHINO, JOSEPH W.	1949
GOFF, WILLIAM H.	1967
HALL, DAVID H.	1971
HARRIS, VIRGINIA J.	1961
HARVEY, DAVID W	1971
HATALSAN, JOHN W.	1963
HENRY, GEORGE F.	1954
HISER, PAUL T.	1958
HOERNER, HARRY J.	1969
HOLLINSHEAD, MERRILL	1952
HOLMEN, HOLGER E.	1969
HORINE, JOHN W.	1961
HYDE, THOMAS E	1973
JACKSON, ROSS P.	1967
JARVIS, JOHN A.	1953

JOHNSON, ROBERT C.	1968
JOHNSON, RUFUS G.	1949
JOHNSON, THOMAS P.	1967
JOHNSTON, WALLACE L.	1968
KOHL, ERNEST O.	1949
KURTZ, HARMON H.	1959
LA BORDE, GERALD K	1973
LAUBENTHAL, CRAIG D.	1969
LEAVITT, WILLIAM C.	1969
LYBARGER, ALVIN E.	
MAC DONALD, MANLEY E	1944
MARSHALL JR, THOMAS C	1941
MC CABE, FRED J.	1970
MEOSKY, PAUL R.	1967
MESSMAN, WARREN B.	1963
MILLER, L. PAUL	1939
NEUFELD, JACOB A.	1968
NIEMELA, ALBERT W.	1949
NOLL, ROBERT F.	1967
OAKLEY, HUGH L.	1954
OLSON, JERRY C.	1964
PEERSON, RICHARD H.	1969
PUFFER, KAREL	1971
RIGGS, DONALD D.	1971
RISHER, CHARLES G.	1953
ROBINSON, FRANK E.	1955
ROBINSON, ORIN R.	1965
SHORE JR, THOMAS C.	1970
SMITH, CARROLL W	1972
SOLTYS, ROBERT G.	1971
STANTON, MILDRED B.	1938
STEPHENS, GEORGE T.	1969
STORMER, DONALD L.	1967
TAYLOR, PAUL G	1971
THOMAS JR, WADE F.	1957
TURECHEK, ARMIN G.	1967
VACEK, WILLIAM L.	1962
VAN DERSLICE, JOHN F	1967
WANGER, RUTH	1971
WATKINS, KENNETH E.	1966
WENDT, DONALD D.	1962
WERNER, WAYNE E.	1969
WILLENSON, MILTON W.	1968
WILKINSON, WILLIAM E	1972
WINDLE, JIM L.	1968
WITT, HENERY F.	1971
WOJCIK, JAMES A.	1971
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DANAHER, EUGENE I.	1946
DURANA, INES	1972
EPSTEIN, JACK H.	1971
GILBERT, PAUL S.	1972
HOPKINS, CHARLES O.	1970
JANSEN, DUANE G.	1972
KOCH JR, CARL	1972
MC CLELLAN, LARRY D.	1971
NEFF, WILLIAM L.	1941
NESTOR, HAROLD M.	1971

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AUTHOR	DATE
ABITIA, FREDDIE	1971
AMELON, DONALD J.	1969
ARMSTRONG, WILLIAM H	1967
BALL, CHARLES E.	1958
BJORNERUD, JAMES A.	1970
BROWN III, ALPHA O.	1971
COZZENS, CHARLES R.	1965
CRAFT, CLYDE O.	1967
EIDE, ARVID R	1973
FINCH, CURTIS R.	1969
FLUG, EUGENE R.	1967
FRANCIS, GEORGE H.	1966
FRESCHET, FERUCIO	1969
FUGAL, GLEN R.	1950
GALLINELLI, JOHN W.	1970
HARDER, JACOB D.	1970
HARDING, LARRY G.	1971
HEYEL, CLARENCE L.	1967
HILL, EDWIN K.	1968
HOFER, ARMAND G.	1963
HOUSEHOLDER, DANIEL	1963
ILOTT, JOHN F. D.	1969
IRWIN, JACK L	1973
JELDEN, DAVID L.	1971
JOHNSON, DOUGLAS H.	1969
KASSAY, JOHN A.	1970
KOBLE, RONALD L.	1963
LUCK, WILLIAM E.	1966
LUDLOW, GERALD C	1973
MC EOWEN, ROBERT H.	1967
MC MURRY, JAMES G.	1964
MEIERHENRY, WESLEY C	1946
NEE, JOHN G	1972
NORTON, ROBERT E.	1967
PRICE, CARROLL S.	1968
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SIMICH, JACK	1965
SMITH, CARRELL L.	1969
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TIFT, KATHERINE F.	1971
TURNER, MERVYN L.	1968
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AUTHOR	DATE
BERGSTROM, PHILIP G.	1970
BLANTON, LLOYD H.	1970
BLOMGREN, ROGER C.	1962
BRO, RONALD D.	1971
BROWDER, LARRY W	1972
BRUECKMAN JR, JOHN C	1969
CHRISTISON, CHESTER	1973
COCHRAN, LESLIE H.	1968
DALE JR, SAM E	1972
DUGGER, WILLIAM E.	1970
FRYE, BILL J.	1971
GEBHART, RICHARD H.	1971
GETTLE, KARL E.	1970
GRUMBLING, HENRY M.	1968
HALFIN, HAROLD H	1973
HAYNES, LUTHER J.	1956
HYDER, CARROLL R.	1971
ISRAEL, EVERETT N	1972
KLEIMAN, HERBERT S.	1966
KUWIK, PAUL D.	1970
LJOSTAD, RODNEY A.	1965
MASON, EMMETT E.	1969
MC KEE, RONALD R.	1971
MILLER, LARRY R.	1971
MILLER, MURRAY L.	1947
MONGERSON, MARTIN D.	1968
OGUNNIYI, OMOTOSHO	1969
ORLANDO, FRANK J	1972
PA DELFORO, HAROLD E	1972
PETER, RICHARD F.	1970
PHALLEN, CHARLES W.	1958
PRICE, CARROLL S.	1968
RESNICK, HAROLD S.	1970
ROSSER, ARTHUR J.	1968
RUSSELL, GENE H.	1970
SMITH, CARROLL W	1972
TIMPER, HANS E	1972
VANN, LOWELL C.	1970
WAKS, SHLOMO	1973
WALGREN, FLOYD B.	1971
WEBER, ROBERT D.	1971
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WEST, WILLIAM E.	1969
WOCKENFUSS, WILLIAM	1960
WOMACK, WILLIAM M.	1971
WOOD, MILTON E	1973
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AUTHOR	DATE
AGUIRRE, EDWARD	1966
BAKER, NORMAN A.	1971
BARON, ANDREW W.	1968
BENSEN, JAMES M.	1967
BIGGAM, WILLIAM R.	1958
BROADHURST, FREDERIC	1969
CORNWELL, RAYMOND L.	1961
CRAFT, CLYDE O.	1967
DENNISON, BOBBY	1970
FOWLER, EWELL W.	1949
FRYE, BILL J.	1971
GALE, STEVE	1954
GREENWALD, MARTIN L	1972
GRUEN, CLEMENS A	1973
GRUNWALD, WALTER	1968
HARDING, LARRY G.	1971
HATLEY, JIMMY D.	1969
HAYNES, LUTHER J.	1956
HERR, JAMES F.	1970
HOERNER, JAMES L.	1969
HORBAKE, R. LEE	1942
HURLEY, CARL E.	1971
ISRAEL, EVERETT N	1972
JUSSIM, ESTELLE	1970
KING, FRANKLIN J.	1970
LEMASTER, LELAN K.	1961
LICHTBLAU, LEONARD R	1958
LONDON, HOYT H.	1934
MC CAGE, RONALD D.	1970
MOEGENBURG, LOUIS A.	1969
MOORE, BILLY M	1973
MORRILL, DAVID	1970
MORRIS, ALLEN E.	1971
NICKERSON, PAUL S.	1947
NISH, DALE L.	1967
OAKLEY, GARY D.	1970
OGUNNIYI, OMOTOSHO	1969
PHILLIPS, JOSEPH W.	1935
ROSS, B. JOHN	1971
ROSSER, ARTHUR J.	1968
RUEHL, PHILIP W.	1961
SCHOESLER, RONALD D.	1971
SERGEANT, HAROLD A.	1968
SMITH, EARL J.	1968
STEELE, GERALD L.	1967
SULLIVAN, JAMES A.	1967
SWERDLOW, ROBERT M.	1969
VANN, LOWELL C.	1970
WILLS, VERNON L.	1965
WRIGHT, WELCOME E.	1953
YFF, JOOST	1965

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BALL, CHARLES E.	1958
BEATTY, CHARLES J.	1967
BETTENCOURT, WILLIAM	1953
BIGGAM, WILLIAM R.	1958
BROWN III, ALPHA O.	1971
CALHOUN, MARJORIE R.	1970
CANNENBERG, RAYMOND	1965
DENNISON, BOBBY	1970
DUFFY, JOSEPH W.	1958
DUTTON, BERNARD	1966
EDDY, EVAN M.	1956
EIDE, ARVID R	1973
ELLIOTT, CHARLES A.	1958
EPPLER, THOMAS L.	1969
FERNS, GEORGE W.	1962
FIELDS, OWEN F	1972
FINKELSTEIN, ABRAHAM	1959
FOWLER, EWELL W.	1949
FREEZE, SAMUEL J	1973
FROELICH, DONALD M.	1970
GUERARD, MICHAEL P.	1971
HAILES, CHARLES W.	1971
HANCOX, FREDERICK J.	1969
HICKMAN, KEITH F.	1967
HILDRETH JR, EDDIE	1972
HOUSKA, JOSEPH T.	1971
HUTCHERSON, ETHEL M.	1966
JASNOSZ, THOMAS A.	1969
JELDEN, DAVID L.	1960
JOHNSON, DELTON L.	1968
JONES, GARY H.	1969
JUSSIM, ESTELLE	1970
KAPLAN, WILLIAM A.	1970
KING, THOMAS G.	1958
KLEINBACH, MERLIN H.	1959
KOONCE, TOMMY R.	1968
LEWCHUK, LESLIE L	1972
LICHTBLAU, LEONARD R	1958
LONDON, HOYT H.	1934
MAHONEY, JAMES H.	1956
MC CAIN, JERRY C.	1959
MC KEE, RONALD R.	1971
MC LENNAND, BERNARD	1971
MILLER, JOHN R.	1970
MILLER, WILBUR R.	1960
MUNS III, NEDOM C.	1969
O NEILL, JOHN N.	1971
OXLEY, VINCENT E.	1969
PAINE, HARRY W.	1943
PAYNE, AM V.	1965
PORTER, HAROLD W.	1948
PREITZ, CLARENCE H.	1969
PUCEL, DAVID J.	1966
PUFAHL, VIRGIL R.	1969
REED, RICHARD L.	1971
REESER, GEORGE W.	1971
RICE, CHARLES M. M.	1958
RILEY, JOHN N.	1972
ROBERTS, LAURENCE A.	1968
ROWEN, MILTON S.	1969
RUEHL, PHILIP W.	1961
RUTEN, WILLIAM H.	1953
SCHANBACHER, EUGENE	1961
SCHOESLER, RONALD D.	1971
SCHOTT, WILLIAM J.	1954
SERGEANT, HAROLD A.	1968
SHOEMAKER, CHARLES E	1961
SMITH, EARL J.	1968
SMITH, JAMES A.	1957
STRONG, MERLE E.	1958
SWERDLOW, ROBERT M.	1969
TOMLINSON, ROBERT M.	1962
TRAUTWEIN, CALVIN L.	1962
TURNER, MERVYN L.	1968
VANN, LOWELL C.	1970
VOGEL, RICHARD F.	1968
WAGNER, EDGAR S.	1960
WARZECHA, EVERETT R.	1972
WELCH, FREDERICK G.	1971
WRIGHT, OSCAR W.	1954
YOUNG, TALMAGE B.	1953
YOUNG, WILLIAM H.	1969

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ADAMS, AARON F.	1961
ARNOLD, DANIEL S.	1968
CAMERON, WALTER A.	1969
CHAMBLISS, KINNETH M	1966
COCHRAN, GEORGE C.	1967
CONROY JR, WILLIAM G	1969
CROUCH, J. PAGE	1968
CUTLER, THEODORE H.	1948
DIRKSEN, RALPH E.	1969
DOWNING, DALLAS L.	1941
DROST, JIM L.	1970
EDSTROM, CARL A	1972
EGGERS, JERRY R.	1970
ESTLE, EDWIN F.	1966
FURIA, JOHN J.	1930
GEHRING, GLEN S.	1969
GURBACH, THOMAS W	1973
HARDER, JACOB D.	1970
HASTINGS, JAMES R.	1953
HOLMEN, HOLGER E.	1969
HYDER, CARROLL R.	1971
KIRBY, JACK	1965
KLABENES, ROBERT E.	1971
KRUGER, JOHN M.	1971
LINE, JOHN D.	1971
LOVELESS, AUSTIN G.	1962
MACALUSO, MICHAEL D	1972
MALI, PAUL	1966
MUELLER, DENNIS L	1972
MUNCRIEF, MARTHA C	1973
C TUEL, MAXCY B.	1969
PAWELEK, ALAN R.	1950
POWER, ANDREW T.	1955
RAU, GERALD N.	1971
ROSENQUIST, BARBARA	1971
SCHMITT, VICTOR A.	1953
SCHROEDER, PAUL E	1973
SHOEMAKER, JIM G	1973
SIRO, EINAR E.	1949
SLATTER, JOHN B.	1970
SMITH, BRANDON B.	1968
SPOONER, KENDRICK L	1973
SUTTON, FRED C.	1961
THORNE III, EDWARD H	1972
VERMEULEN, ROBERT	1968
WALLS, W. DALE	1964
WHEELER, EDWARD A.	1965
WILSON, ROGER J.	1970
WINDHAM, BILLY L.	1972
TALBOTT, LAURENCE F	1973
TRUDEAU, TERENCE J	1972
TURNER, WILLIAM G	1973
VAN ETTEN, MARVIN D	1972
WALLACE, DONALD F	1972
WEBER, EARL M.	1961
WINTERS, KENNETH W.	1970

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AUTHOR	DATE
BOTSFORD, JON F.	1972
DARM, ADAM E.	1971
EDWARDS, JOHN T.	1970
GAILEY, DAVID S.	1969
GAUTHIER, MICHAEL K	1972
HALL, RONALD W.	1970
HANSEN, MAX E.	1964
HARRIS, JAMES N.	1969
HAUGO, RICHARD R.	1969
JAMES, WILLIAM E.	1971
KEIL, RAYMOND L.	1966
KEITH, CHARLES W.	1964
LEWIS, MYRON E.	1970
MOON, DONALD E.	1968
PREWITT, ROGER W	1973
SHULL, HOWARD I.	1969
SIMONS, JEROLD J.	1967
STEWART, HORACE L	1973
STROM, IRVING E.	1970
STUESSY, EUGENE L.	1969

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AUTHOR	DATE
GAUTHIER, MICHAEL K	1972

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EVANS, HARRY L.	1953
SOLIMAN, ABDEL RAZEK	1970

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AUTHOR	DATE
ALLEN, CAMERON K	1973
BAIER, JON W	1973
BAILEY, GERALD D.	1964
BAILEY, MILTON J.	1968
BERRY, JAMES W.	1972
BJORKQUIST, DAVID C.	1965
BLANKENBAKER, EDWIN	1970
BORRI, ROBERT	1942
BORTZ, RICHARD F.	1967
BROWDER, LARRY W	1972
BUDKE, WESLEY E.	1970
BURROUGHS, MARVIN G.	1970
CHRISTIAN, JACK B.	1969
CLENDENNING, LEE R.	1972
COLLINS, CHARLES J.	1968
CONROY JR, WILLIAM G	1969
D AMBROSIO, VINCENT	1969
DALE JR, SAM E	1972
DAVIS, EDDIE M.	1971
DUENK, LESTER G.	1966
DUFFY, JOSEPH W.	1958
DUTT, KARL F.	1969
ERICKSON, JOHN H.	1953
EVERSOLL, ROBERT I.	1971
FIKE, IRIS L.	1956
GEBHART, RICHARD H.	1971
GETTLE, KARL E.	1970
GUTH, THEODORE E	1973
HAIGWOOD, THOMAS L.	1959
HERRING, TOD H.	1962
HOUSEHOLDER, DANIEL	1963
KABAKJIAN, EDWARD	1969
KAPES, JEROME T.	1971
KEENER, CLYDE	1959
KIEFT, LEWIS D.	1970
KRUGER, JOHN M.	1971
LE BLANC, DARRELL R.	1971
LEVANDE, JAMES S	1972
LICHTBLAU, LEONARD R	1958
LOEPP, FRANZIE L.	1970
MARCH, BRYCE D.	1961
MAYS, WILLIAM A.	1954
MC KELL, WILLIAM E.	1970
MC MURRY, JAMES G.	1964
MENEGAT, PAUL A.	1953
MIDDLETON, WILLIAM H	1962

MILLER JR, FRANK M.	1971
MILLER, DUDLEY B.	1965
MILLER, JOHN G.	1954
MILLER, WILBUR R.	1960
MORGAN SR, LEO D.	1966
MOSLEY, SAMUEL N.	1970
NICHOLS, DWIGHT W.	1955
NIELSEN, ARNOLD M.	1970
PALOW, WILLIAM P.	1969
PANKOWSKI, DALLAS J.	1966
PASTER, JULIUS	1959
PENDERED, NORMAN C.	1951
PETER, RICHARD F.	1970
RANDOLPH, JAMES R.	1972
REMICK, EDWARD L.	
ROLLINGS, JAMES W.	1967
ROY, WENDELL L.	1963
RUGGLES, STANFORD D.	1969
SIMICH, JACK	1965
SMITH, CARROLL W	1972
SMITH, EARL M.	1971
SPENCE, WILLIAM P.	1957
ST JOHN, DAVID R.	1971
THOMPSON, ROBERT L.	1947
TOSH, DONALD J.	1971
VAN TASSEL, RAYMOND	1948
VOELKNER, ALVIN R.	1970
VOGEL, RICHARD F.	1968
WARNER, RICHARD A.	1969
WENTZ, CHARLES H.	1969
YOUNG, DARIUS R.	1968
ZIMMERMAN, FRED W.	1957

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AUTHOR	DATE
BERGSTROM, PHILIP G.	1970
BLOMGREN, ROGER D.	1962
BROWN, WILLIAM E.	1964
BURNS, WILLIAM E.	1965
CHERRY, ROGER W	1972
COLE, DARRELL D	1972
COLEMAN, JAY M.	1971
CROY, FLOYD E	1972
DAINES, JAMES R.	1968
DE OLD, ALAN R.	1971
DEADY, JOHN J.	1970
DECKER, HOWARD S.	1953
DETWILER SR, WAYNE L	1971
DIRKSEN, RALPH E.	1969
EDDY, EVAN M.	1956
EISS, ALBERT F.	1954
EPPLER, THOMAS L.	1969
ETHIRVEERASINGAM, NA	1971
EVEN, MARY J.	1971
FRAGALE, MARVIN J.	1969
GEBHART, RICHARD F.	1971
GRIFFIN, RAYMOND V.	1965
GRIFFITH, JOHN L.	1967
HANSEN, GARY G	1972
HARRELL, WILLIAM R	1972
HERRING, TOD H.	1962
HEYEL, CLARENCE L.	1967
HILL, JOSHUA	1972
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
IRVINE, FLEET R.	1968
IRWIN, JACK L	1973
JACOBSEN, JAMES H.	1966
JANECZKO, ROBERT J.	1971
JELDEN, DAVID L.	1960
JENKINS JR, JAMES	1955
JOHNSON, RAY A.	1971
JOHNSON, WAYNE C.	1969
KIEFT, LEWIS D.	1970
LA BORDE, GERALD K	1973
LANDERS, MACK M	1972
LAWSON. TOM E	1973

MANNION, EDMUND J.	1972
MARCH, BRYCE D.	1961
MAXON. LLOYD M.	1970
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MILLER JR, FRANK M.	1971
MILLER, LARRY R.	1971
MILLER, WILBUR R.	1960
MILLS, BOYD C.	1967
NEVITT, THOMAS A.	1966
NISH, DALE L.	1967
PALOW, WILLIAM P.	1969
REHORN, GLEN E	1972
ROBERTSON, ROY P.	1967
ROTHMAN, ROBERT A.	1969
SAGE, JAMES E.	1971
SCHACHT, ROBERT C.	1971
SCHMITT, MARSHALL L.	1953
SEIGLER, CLAUDE I.	1970
SEGUIN, ARMAND M	1973
SHIGETOMI, SAMSON S.	1970
STAMBOOLIAN JR, JOHN	1972
THOMPSON, ROBERT L.	1947
TOMLINSON, ROBERT M.	1962
WALGREN, FLOYD B.	1971
WARREN, WILLIAM H.	1970
WHITE, CONRAD L.	1970
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WRIGHT, RONALD T.	1971
WYNN, PHILIP D.	1970
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AUTHOR	DATE
COATES, NORMAN	1967
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FLUCK, BRYAN V.	1970
FOSTER, HOWARD G.	1969
GARRETT, ARTHUR M.	1971
GORDON, LINDA	1971
HARVEY, EDWARD B.	1967
HOSTETLER, IVAN	1945
KARNES, M. RAY	1948
KLATT, LAWRENCE A.	1967
LAND, SAMUEL L.	1931
METZLER, JOHN H.	1970
O CONNELL, JOHN F.	1971
ROBINSON, JAMES W.	1967
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STUART, IRVING R.	1951
TEMPLETON, RONALD K.	1967
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CALEY, PAUL C.	1969
CZARNECKI, EDGAR R.	1967
ENGLISH, ROBERT W.	1950
FOWLER, RICHARD J.	1965
GRUMBLING, HENRY M.	1968
HICKS, CAROL E	1973
KLEHM, WALTER A.	1937
LE BLANC, DARRELL R.	1971
MITCHELL, JOHN	1954
MONTELLO, PAUL A.	1968
PONTYNEN, BURTON A	1973
SEARS JR, WOODROW H.	1971
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STEINGART, JACOB	1970
TAYLOR, HENRY T	1973
TURNER, WILLIAM G	1973
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ACHILLES, CHARLES M.	1967
BARSTOW JR, ROBBINS	1967
BERGENGREN JR, ROY F	1953
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CARLSON, HENRY L.	1967
FULLER, MARY M.	1970
HAMMER, GERALD K.	1962
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HEJKAL, OTTO C.	1950
HILL, RICHARD E.	1970
HORTON, GEORGE R.	1967
HOSLER, FRED W.	1938
HUNTINGTON, HAROLD A	1940
HUXOL, ROBERT L.	1954
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KACHEL, STANLEY	1967
LA BOUNTY JR, HUGH D	1961
LIEN, DAVID A.	1971
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VALENTINE, IVAN E.	1969
WARD, CARRELL L.	1971
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BARSTOW JR, ROBBINS	1967
BASS, WILBUR A.	1967
CANADA, BRIAN L.	1972
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GLAU, JON E.	1970
HANSEN, GARY B.	1971
HEINSOHN, MARVIN E	1973
KAVICH, LAWRENCE L.	1964
KING, HOMER P.	1934
KOCH JR, CARL	1972
LOCKE, LEWIS A.	1969
MC CLELLAN, LARRY D.	1971
MILLER, L. PAUL	1939
MORGAN, JACK W.	1951
PISANI, JOSEPH R	1972
PRATT, ARDEN L.	1968
SERRAS, VIDAL V	1972
SHUNN, DONALD W	1972
TEMPLETON, RONALD K.	1967
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HUMBLE, MILFORD K.	1937
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PINCKNEY, CHARLES W.	1953

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CUNNINGHAM, BERYL M.	1952
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STEPHENS, ROBERT L.	1969
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BAILY, ATHOL R.	1949
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CALERO, THOMAS M	1972
CASSIMATIS, PETER J.	1967
DOUGLAS, DAVID E	1973
EDWARDS, JOHN T.	1970
EISENBERG, WILLIAM L	1947
EISS, ALBERT F.	1954
ELIAS, JOHN E.	1970
FOLTMAN, FELICIAN F.	1950
GOLD, CLARENCE H.	1967
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LEWIS, MYRON E.	1970
LONG, GILBERT A.	1970
MARSHALL, CHARLES R.	1971
MASON, EMMETT E.	1969
MC ARTHUR, ROSS J.	1955
MINELLI, ERNEST L.	1957
MOULLETTE, JOHN B.	1970
POLOMSKY, JOHN V.	1969
RIETH, CLAUDE E.	1966
RIMLER, GEORGE W.	1969
SCHEMPF, KENNETH W	1972
SHAFER, CARL I.	1961
SHEFFIECK JR, CHARLE	1969
SVENDSEN, CLARENCE R	1970
VOELKNER, ALVIN R.	1970
ZIEL, HENRY R.	1961

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AUTHOR	DATE
BOWMAN, JAMES E.	1958
GILLIE SR, ANGELO C.	1967
GUNDERSON, B. HARRY	1949
HOFFMAN, LARRY D.	1971
KOLLIN, ROBERT	1971
LAWS, NORMAN G.	1966
MARCINOWSKI, MARY E.	1971
MATTHEWS JR, PAUL J.	1972
MYERS, ROY E.	1971
NOLL, ROBERT F.	1967
PEEL, NANCY D.	1967
RONEY, MAURICE W.	1964
SHOEMAKER, BYRL R.	1957
SIMONS, JEROLD J.	1967
SLATTER, JOHN B.	1970
STALLINGS, DANIEL N.	1969
STUESSY, EUGENE L.	1969
WASHBURN, KENNETH R.	1971

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ALLEN, DELL K	1973
BERRY, ARTHUR O.	1967
COATES, NORMAN	1967
DEAN, ERNEST D.	1968
DIRKSEN, RALPH E.	1969
DUNLAP, EUGENE W.	1962
FALLS, JOHN E.	1968
GEBHART, RICHARD H.	1971
GERBER, RUSSELL L.	1966
HALL, RONALD W.	1970
HARRIS, EDWIN J.	1971
ILLINIK, ROBERT L.	1971
KAISER, HENRY	1968
KAPLAN, HAROLD	1956
KREIDER, LEONARD E.	1968
KURIEN, CHEMPALATHAR	1967
KUWIK, PAUL D.	1970
LEFFARD, WARREN L.	1968
MANSFIELD, WESLEY B.	1970
MASON, EMMETT E.	1969
MOON, DONALD E.	1968
MULLER, ARTHUR E	1972
ORLANDO, FRANK J	1972
SMALLEY, LEE H.	1962
STEINGART, JACOB	1970
TICHENOR, HAROLD D.	1967
TURNER, ROBERT E.	1957
WAITKUS, LORIN V.	1971
WHITE JR, EDWARD H	1973
WU, JACK	1973
YOUMANS, CHARLES V.	1955
ZOOK, WAYNE H.	1968

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ABRAMSON, BERNARD	1950
ARBELO-ATILES, RAFAE	1972
BABCOCK, JAMES G.	1969
BAKER, NORMAN A.	1971
BALZER, EUGENE W.	1972
BARON, ANDREW W.	1968
BENDER, MICHAEL	1971
BENSEN, JAMES M.	1967
BOUTWELL JR, COLEN J	1971
BROADHURST, FREDERIC	1969
BROOKS, WESTON T.	1964
CHASTAIN, GARY K.	1972
CHRISMAN, JOSEPH P.	1970
CORNWELL, RAYMOND L.	1961
CROWDER, GENE A.	1968
DE OLD, ALAN R.	1971
DUTTON, BERNARD	1966
DYER, PALMER E.	1970
EPPLER, THOMAS L.	1969
FLEMING, BRUCE E.	1969
FLUG, EUGENE R.	1967
GALE, STEVE	1954
GIERKE, EARL W.	1970
GLAZENER, EVERETT R.	1958
GROVES, EDWIN D.	1970
GRUMBLING, HENRY M.	1968
HARMON, JAMES S.	1969
HERR, JAMES F.	1970
HILL, EDWIN K.	1968
HOCH, EMIL H.	1969
HOFER, JARREL	1969
HURLEY, CARL E.	1971
JASNOSZ, THOMAS A.	1969
JELDEN, DAVID L.	1971
JENKINS, JOHN C.	1969
JONES, GARY H.	1969
KING, FRANKLIN J.	1970
KIRKWOOD, JAMES J.	1970
KOONCE, TOMMY R.	1968
KREJOIE, ROBERT V.	1968
KRUPPA, JOHN R.	1968
MACALUSO, MICHAEL D	1972
MC CAGE, RONALD D.	1970
MEERS, GARY D	1972
MILLER, JOHN R.	1970
MOEGENBURG, LOUIS A.	1969
MORRILL, DAVID	1970
MUNS III, NEDOM C.	1969
NESTEL, GERALD E.	1970
NICKERSON, PAUL S.	1947
O NEILL, JOHN N.	1971
OAKLEY, GARY D.	1970
PAYNE, AM V.	1965
PHILLIPS, JOSEPH W.	1935
PHILLIPS, THOMAS G.	1971
PUFAHL, VIRGIL R.	1969
RAPHAEL, MICHAEL A.	1971
RAPP, ALFRED V.	1972
REESER, GEORGE W.	1971
RILEY, JOHN N.	1972
ROUTH, JERRY D.	1970
ROWEN, MILTON S.	1969
SCHOESLER, RONALD D.	1971
SMITH, EARL J.	1968
SMITH, FREDDY J.	1970
SMITH, JAMES A.	1957
SNYDER, VANCE B.	1960
SUMTER, PAUL E.	1969
THATCHER, GLENN M.	1970
UMSTATTD, WILLIAM D.	1970
WARZECHA, EVERETT R.	1972
WEIR, ELDON L.	1970
WILKES, DORAN F.	1966
WILLS, VERNON L.	1965
WOOD, MILTON E	1973
YEAGER, LOWERY D.	1965
YOUNG, WILLIAM H.	1969

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GUNDERSON, B. HARRY	1949
RANDOLPH, EUGENE J	1972
PORTER, HAROLD W.	1948
RUSSELL, ELLSWORTH M	1950
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SEAL, MICHAEL R.	1969
SINGLETARY, THOMAS A	1968
SNITZ, RUBEN H.	1931
STANGLE, PAUL L.	1967
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AGUIRRE, EDWARD	1966
AMELON, DONALD J.	1969
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AXELROD, AARON	1951
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BECKER, DEROLD W.	1969
BOCKMAN, DAVID C.	1971
BRILEY, FRANK E.	1967
BUXTON, ROBERT E.	1960
CAMBELL, CLIFTON P.	1971
CAMPBELL, CLIFTON P.	1971
CUSHING, NELSON N.	1971
CREW, ALFRED S.	1962
EVANS, RUPERT N.	1950
FALLS, JOHN E.	1968
GORDON, LINDA	1971
GRAHAM, GREGORY S.	1971
GRIESENBROCK JR, HER	1955
HALE, LESTER W.	1967
HARPER, HERBERT D.	1934
HAUSER, ROGER E.	1971
HOFER, ARMAND G.	1963
HOOVER, ROGER L.	1967
HOROWITZ, IRVING L.	1939
ILLINIK, ROBERT L.	1971
IVES, QUAY D.	1971
KLEIN, CHARLES T.	1942
LANDERS, FREDERICK W	1937
LEFFARD, WARREN L.	1968
LEHN, LLOYD L.	1967
MC GAW, SIDNEY E.	1952
MEDEIROS, EDWARD J.	1970
MILLER, THOMAS W.	1958
NAROFF, ARNOLD	1971
NICHOLS JR, GEORGE V	1971
ORR, WILLIAM H.	1970
PARDINI, LOUIS J.	1967
PEDERSEN, GEORGE L.	1957
PITTMAN, FRANK M.	1970
RAMP, WAYNE S.	1956
RAU, GERALD N.	1971
RAY, WILLIS E.	1957
RILEY, JOHN N.	1972
ROSS, RAYMOND J.	1966
RUMMELL, WINFIELD R.	1971
RUSSELL, ELLSWORTH M	1950
RUTEN, WILLIAM H.	1953
SALMON, DANIEL A.	1965
SHIH, WEI-TUN	1969
SINGLETARY, THOMAS A	1968
SOLIMAN, ABDEL RAZEK	1970
SONNY, JACOB	1971
STANGLE, PAUL L.	1967
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BECKER, DEROLD W.	1969
BENSEN, JAMES M.	1967
BENSON, M. J.	1967
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
BORTZ, RICHARD F.	1967
BOUTWELL JR, COLEN J	1971
BROWN, JAMES T	1973
BROWN, GEORGE J.	1960
BZOWSKI, EDWARD C.	1969
CALDER JR, CLARENCE	1964
CHASTAIN, GARY K.	1972
CLAWSON, LA VERE E.	1967
CLENDENNING, LEE R.	1972
COMER, JOHN C.	1970
COOVER, SHRIVER L.	1941
CUSHING, NELSON N.	1971
D AMBROSIC, VINCENT	1969
DEAN, ROBERT D.	1959
DENOVA, CHARLES C.	1968
DOTY, CHARLES R.	1968
FAGAN, RAYMOND E. B.	1954
FINKRAL, KEITH C	1972
FLUG, EUGENE R.	1967
GEDEON, DAVID V.	1971
GIMBEL, ARMIN F.	1953
GRANEY, MAURICE R.	1942
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HANSON, ROBERT R.	1970
HENAK, RICHARD M.	1971
HERR, JAMES F.	1970
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HOLM, MELVIN G.	1972
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
HURLEY, CARL E.	1971
JANECZKO, ROBERT J.	1971
JENKINS JR, JAMES	1955
JENKINS, JOHN D.	1969
JOLLY, FRANK H.	1970
KASSAY, JOHN A.	1970
KIEFT, LEWIS D.	1970
KRUGER, JOHN M.	1971
KRUPPA, RICHARD A.	1970
LARUE, JAMES P.	1968
LINTON, JOHN A.	1951
LUTZ, RONALD J.	1969
MARTIN, GORDON E	1972
MARTINEZ, PETE	1970
MC EOWEN, ROBERT H.	1967
MEERS, GARY D	1972
MEYER, JOHN M.	1969
MILLER, JAMES A.	1971
MILLS, BOYD C.	1967
MOORE, BILLY M	1973
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NICHOLS JR, GEORGE V	1971
NORTON, ROBERT E.	1967
OAKS, MERRILL M.	1970
ORR, WILLIAM H.	1970
PRITCHARD, MIRIAM C.	1937
RAPHAEL, MICHAEL A.	1971
REBHORN, ELDON A.	1972
RICHARDSON, ROBERT B	1967
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
STANTON, MILDRED B.	1938
SUESS, ALAN R.	1962
SWANSON, RICHARD A.	1968
THIEME, EBERHARD	1965
WAISNER, GARY L.	1970
WEFFENSTETTE, WALTER	1965
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WOMACK, WILLIAM M.	1971
WORTHINGTON, ROBERT	1958

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HAMMER, GERALD K.	1962
LUCE, LAWRENCE W.	1957
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RYAN, JAMES E.	1964

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DENT, JAMES A	1972
LAPIDUS, GEORGE	1954
LOCKETTE, RUTHERFORD	1956
NICHOLSON, DAVID H.	1948
REESER, GEORGE W.	1971
SPAULDING, LLOYD F.	1971
STANFIELD, FOSTER A.	1971
STELZNER, RAYMOND R.	1969
STEPHENSON, DONALD J	1970
TATE, JOEL C	1972

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AUTHOR	DATE
ILOTT, JOHN F. D.	1969
KURIEN, CHEMPALATHAR	1967
LINDAHL, LAWRENCE G.	1944
SMALLEY, LEE H.	1962
STEINGART, JACOB	1970
TRYON, VERNON A	1972
WHITE JR, EDWARD H	1973

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AUTHOR	DATE
BATES, WILLIAM M.	1969
BETTIS, LLOYD E.	1971
KLEIN, CHARLES T.	1942
LANG, EDWARD H.	1942

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DITZLER, WALTER E.	1953

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AUTHOR	DATE
ALLEN, JAY M.	1967
BACKUS, KERBY D.	1968
BIEDLER, JOHN S.	1958
BROWN, WILLIAM E.	1964
BURNS, WILLIAM E.	1965
DAVIDSON, JOHN E.	1968
DENNIS, ERVIN A.	1966
DOTY, CHARLES R.	1968
DUNLAP, EUGENE W.	1962
FALES, ROY G.	1948
HALL, JAMES F.	1954
HAWSE, JOHN E.	1964
HOLTROP, WILLIAM F.	1948
IVINS, WILSON H.	1947
JANECZKO, ROBERT J.	1971
JENNINGS, GERALD L.	1968
JULIAN, LESTER J.	1953
KEITH, CHARLES W.	1964
KEMP, WILLIAM H.	1966
KLEHM, WALTER A.	1937
LAWSON, TOM E	1973
LEWCHUK, LESLIE L	1972
MASSEY, HAL	1965
MELINE, CHARLES W.	1965
MOELLER, CARL A.	1961
PARDINI, LOUIS J.	1967
POWER, ANDREW T.	1955
RICHARDS, FREDDIE L	1972
ROY, WENDELL L.	1963
SCHAEFER, ROGER A.	1969
TALKINGTON, JOE E.	1962
TURNER, ALFRED B.	1941
TURNER, BRIDGES A.	1941
WAINA, RICHARD B.	1969
WOODY JR, EARL T.	1963
ZAHARCHUK, TED M	1971

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AUTHOR	DATE
BRENHOLTZ, GERALD S.	1967
BROWN, B. WESLEY	1960
BURRIS, WAITUS R.	1967
DE VORE, PAUL W.	1961
DODGE, ARTHUR F.	1935
FAULDS, VINCENT R.	1956
GREER, JOHN S.	1967
HAGGLUND, GEORGE S.	1966
HAMPTON, THOMAS E.	1950
MC DOWELL, LEONARD C	1964
MC INNIS, DONALD W.	1971
MILLER, L. PAUL	1939
MILLER, MARY D	1971
MORGAN, CARYLE W.	1968
NYE, PHARES S	1972
OGUNNIYI, OMOTOSHO	1969
PLUSCH, JAMES C.	1967
RICHARDSON, ROBERT B	1967
SAINTY, GEOFFREY E	1972
SKOUBY, ERIC W	1972
SOLIMAN, ABDALLA M.	1967
TAYLOR, PAUL G	1971
VAN GIGCH, JOHN P.	1968
WALLACE, DONALD F	1972
YOUMANS, CHARLES V.	1955

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AKEY, WAYNE W.	1952
AL-BUKHARI, NAJATI M	1968
ALLEN, JAY M.	1967
ANDERSON, ROBERT G.	1967
ANDRE, NEVIN E.	1964
ATTEBERRY, PAT H.	1954
BAKER, RONALD D.	1968
BARNETT, LEONARD J.	1969
BARRINGER, DEAN	1971
BASKIN, SAMUEL	1954
BAYNE, GEORGE K.	1972
BLACK, DONALD E.	1970
BLOMGREN, GLEN H.	1972
BOGETICH, THOMAS M.	1972
BREWSTER, JAMES H.	1971
BROEMAER, GARY M.	1968
BROWN, WALTER E.	1971
BRUE, JAMES E.	1969
BURGETT, DONALD C.	1970
BUXTON, ALAN	1972
CAMBRIA, SOPHIA T.	1945
CHILSON, JOHN S.	1969
CHRISTENSEN, JAMES E	1972
CLABAUGH, RICHARD D.	1971
COHEN, LOUIS A.	1965
CONFREY, EVAN E	1967
CORMACK, ROBERT B.	1970
CRABTREE, JAMES S.	1967
CRUNKILTON, JOHN R.	1969
CUONY, EDWARD R.	1953
DAUGHERTY, RONALD D.	1971
DENT, JAMES A	1972
DEMPSEY, DON G.	1972
DIVINE, LLOYD E	1973
DONADIO, BLASE	1969
DUHON, HOWARD	1972
ENVICK, ROBERT M.	1970
EVERSOLL, ROBERT I.	1971
FEATHER, DON B.	1949
FEGAN, HAROLD J.	1971
FLUEGGE, LYNN R.	1972
FRANTZ JR, NEVIN R.	1967
FREEZE, SAMUEL J	1973
FRISBY, RUSSELL C.	1968
FUGLSBY, GLEN O.	1965
GASSERT, WILLIAM M.	1972
GOFF, WILLIAM H.	1967
GRANTHAM, LAWRENCE B	1972
HALL, DAVID H.	1971
HAYES, BILLY D.	1968
HOENES, RONALD L.	1970
HOLMES, LONNIE A.	1971
HULLE, WILLIAM A.	1972
JACKMAN, DUANE A.	1961
JONES, JANIE L.	1969
JUDD, WILLIAM P.	1971
KANTER, STUART A.	1968
KAVIEFF, MELVIN C.	1961
KEMELGOR, BRUCE H	1973
KILLAM, JACQUELINE R	1972
KISTLER, DALE E.	1971
KLEINTJES, PAUL L.	1953
KO, JIIN-RONG	1972
KOCH, JAMES L	1972
KREIDER, LEONARD E.	1968
KURTZ, HARMON H.	1959
LAHREN, JAMES A.	1970
LE BLANC, DARRELL R.	1971
LEMLEY, JOE W.	1970
LEONARD, REGIS L.	1950
LIEN, DAVID A.	1971
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LOOSLE, DARRELL K.	1967
LOWENSTEIN, NORMAN	1955
MAC ARTHUR, EARL W.	1971
MARTIN, WALDO D.	1970
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MARTINEZ, LEONARDO	1972
MASLEY, PHILIP T	1966
MC CABE, FRED J.	1970
MC CRACKEN, JOHN D.	1970
MC NEILL, JOSEPH G.	1970
MC ROBBIE, J. M.	1963
MILLER, MARY D	1971
MINKEVICH, GEORGE	1972
MORRISON, JESSIE S.	1969
MORTIMER, WILLIAM E.	1956
MURPHY, JAMES O.	1972
NAROFF, ARNOLD	1971
NASH, MC KINLEY M.	1972
NICHOLS, JACK D.	1970
NIEMELA, ALBERT W.	1949
NOTHDURFT, MARIE E	1972
NYE, PHARES S	1972
OLSON, RICHARD R.	1971
OSBORN, JIMMIE D	1972
OSORNO, WENDELL A	1972
PEEL, NANCY D.	1967
PELLEGRIN JR, JOSEPH	1971
PETERSEN, MOLEN L.	1971
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POULIN, DONALD A	1972
PRICE, CARROLL S.	1968
RANDOLPH, JAMES R.	1972
RAYFORD, ERWIN W.	1967
RELYEA, GLADYS M.	1937
RICE JR, JOSEPH A.	1971
RIGGS, DONALD C.	1971
ROBERSON, ROY P.	1967
ROBERTS, LAURENCE A.	1968
ROBINSON, CLARK N.	1947
ROBINSON, MENDEL L.	1970
ROBINSON, ORIN R.	1965
RONODIDIJOJO, SOEWAN	1968
RUSSELL, SAMUEL E.	1966
SAINTY, GEOFFREY E	1972
SCHELLER, THOMAS G.	1967
SCHMIDT, RICHARD W	1971
SCHOEPPLER, JACOB	1958
SELMAN, JAMES W.	1967
SHIGETOMI, SAMSON S.	1970
SHULTZ, FRED A.	1971
SMITH, EARL J.	1968
STUART, IRVING R.	1951
TATUM JR, JULIAN P.	1967
THOMPSON, RANDALL L	1972
TOSH, DONALD J.	1971
TRAMBLEY, JOHN B.	1969
TURECHEK, ARMIN G.	1967
TURNER, ROBERT E.	1957
VAN GIGCH, JOHN P.	1968
VANTRUMP, WILLIAM F.	1961
WALLACE, DONALD F	1972
WARD, DARRELL L.	1971
WARNER, JAMES C.	1962
WHATLEY, ALICE E.	1967
WHEELER JR, CHARLES	1967
WHYBARK, DAVID C.	1967
WIGGS, GARLAND D.	1971
WILLENSON, MILTON W.	1968
WILLIAMS, ROBERT T.	1969
WYNNE, ROBERT L.	1968
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BREWSTER, JAMES H.	1971
BROWN, MILTON T.	1948
CURTIS, BYRON W.	1968
EISS, ALBERT F.	1954
ENVICK, DONALD D.	1968
ERWIN, CLIFFORD H.	1963
FAULDS, VINCENT R.	1956
FLEMING, JOSEPH W.	1937
FUGLSBY, GLEN C.	1965
GAINES, THOMAS R.	1955
GALLUP, LELLAND L.	1970
GERBRACHT, CARLTON J	1949
GIETL, RUDY E.	1971
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GUDITUS, CHARLES W.	1965
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HAGEMEYER, RICHARD H	1960
HALL, RONALD W.	1970
HAMPTON, THOMAS E.	1950
HILL, FREDERICK W.	1942
HINRICHS, ROY S.	1964
HODGSON, PAUL M.	1965
HOGHAUG, HAROLD T.	1971
HOROWITZ, IRVING L.	1939
HUNTER, ELVIN M.	1963
INGRAM, THEODORE	1971
JENKINS, JOSEPH R.	1971
JETTER, EVERETT V.	1932
JONES, JANIE L.	1969
JORDAN, KENNETH F.	1969
KAFFER, FRED C.	1941
KARNES, JAMES B.	1966
KJOS, OSCAR E.	1954
KRUSKOP, LEROY L.	1969
LANGERMAN, PHILLIP D	1968
LITTRELL, JOSEPH J.	1958
LUFF, ANDREW C.	1955
MANNING, GEORGE E.	1971
MARTIN, LOREN	1973
MARTIN, WALDO D.	1970
MEYERS, LARRY D.	1968
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MILLS, BOYD C.	1967
MURRY, CLAIR A	1972
NIHAN, GEORGES L	1973
O NEILL, JACK H.	1954
PEEL, NANCY D.	1967
PRATER, ROBERT L.	1962
RELYEA, GLADYS M.	1937
RELYEA, GLADYS M.	1937
RICE JR, JOSEPH A.	1971
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SCHORLING, HORACE O.	1950
SIMONS, ROBERT M.	1969
SNOW, JOHN W.	1966
SPRANKLE, NORMAN H.	1971
STEPHENS, ROBERT L.	1969
STRUCK, JOHN W.	1956
TAKIS, JOHN P	1972
TATSCH, CLINTON E.	1970
TEMPLE, CHARLES M.	1970
THOMPSON, RANDALL L	1972
TIFT, KATHERINE F.	1971
TURNER, ERWIN	1958
TURNER, ROBERT E.	1957
VANTRUMP, WILLIAM F.	1961
VINCENT JR, WALTER C	1972
WALSTON, HARRY W.	1970
WARNER, JAMES C.	1962
WEEDE, GARY D.	1967
WENDT, DONALD D.	1962
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IACOBELLI, JOHN L.	1969
JAHRMAN, QUAIN K.	1964
KACHEL, STANLEY	1967
KEIL, RAYMOND L.	1966
KRUPPA, RICHARD A.	1970
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GOLOMB, ARTHUR E.	1962
KAISER, HENRY	1968
KILLAM, JACQUELINE R	1972
NISH, DALE L.	1967
OLSEN, GEORGE A.	1971
RUNNALLS, JAMES J.	1965
STEELE, GERALD L.	1967
THORNTON, ROBERT W.	1971
ZOOK, WAYNE H.	1968

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AUTHOR	DATE
ALLEN, JAY M.	1967
BARNETT, LEONARD J.	1969
CAMBRIA, SOPHIA T.	1945
CHERRY, ROGER W	1972
COHEN, CHESTER G.	1970
COX, ROBERT L.	1970
CUONY, EDWARD R.	1953
DETRICK, RONALD L.	1972
CRENNAN, JERRY D.	1970
DUGGER, CECIL W.	1968
ELMGREN JR, G. THEOD	1963
ERWIN, CLIFFORD H.	1963
FLUCK, BRYAN V.	1970
FRISBY, RUSSELL C.	1968
FUGLSBY, GLEN O.	1965
FULLER, FOSTER D.	
GALLAGHER, JAMES E.	1970
HAYES, BILLY D.	1968
HILLSMAN, SALLY	1970
HOLMES, LONNIE A.	1971
JACKSON, THOMAS A.	1962
KEMELGOR, BRUCE H	1973
KISTLER, DALE E.	1971
KORB, AUGUST W	1972
LEAVITT, WILLIAM C.	1969
MAC DONALD, MANLEY E	1944
MARTIN, LOREN	1973
MATTESON, GERALD R.	1966
MC CLURE, CLOIS A.	
NIENHAUS, BERNARD J.	1971
NORTON, ELIZABETH N.	1970
O CONNELL, JOHN F.	1971
OLSON, RICHARD R.	1971
PODVIA, M. WAYNE	1972
PRATER, ROBERT L.	1962
PREWITT, ROGER W	1973
PRICE, ROBERT G	1973
RAMP, WAYNE S.	1956
RAYFORD, ERWIN W.	1967
RIETH, CLAUDE E.	1966
ROBINSON, CLARK N.	1947
ROBINSON, ORIN R.	1965
ROSENQUIST, BARBARA	1971
RUMPF, EDWIN L.	1954
RUTHERFORD, WILLIAM	1962
SAINTY, GEOFFREY E	1972
SCHENCK, JOHN P.	1969
SCHRAMM, DWAYNE G.	1969
SHERRELL, EUGENE G.	1969
STUART, WILLIAM R.	1972
TATE, JOEL C	1972
THOMPSON, GUERN K.	1971
THOMPSON, RANDALL L	1972
TICHENOR, HAROLD D.	1967
TODD, JOHN D	1972
TREGO, JOHN W.	1958
TROOBOFF, BENJAMIN M	1968
TRUDEAU, TERENCE J	1972
UBELACKER, SANDRA D.	1971
VINCENT JR, WALTER C	1972
WANGER, RUTH	1971
WARNER, JAMES C.	1962
WASHBURN, KENNETH R.	1971
WATERSTREET, DONALD	1969
WEBB, R. IAN A.	1971
WENDT, DONALD D.	1962
WERTHEIM, JUDITH B.	1971
WIED, ALEXANDER F.	1972
WOMACK, WILLIAM M.	1971
WOMMACK, CHARLES H.	1967
WOOD, GRANT R.	1970
WRIGLEY, MARGARET	1968
ZOOK, WAYNE H.	1968
ZUDAK, LAWRENCE S.	1969

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AUTHOR	DATE
ALLEN, WILLARD A.	1963
COLLIER, JAMES A	1973
CROY, FLOYD E	1972
DAVIS, JIM L.	1966
ECKER, LOUIS G.	1965
GALE, STEVE	1954
GARRETT, ARTHUR M.	1971
GORDON, KENNITH G.	1971
GRANNIS, GARY E.	1970
GUENTZLER, WILLIAM D	1973
HOGHAUG, HAROLD T.	1971
JANECZKO, ROBERT J.	1971
KIKER, CHARLES M	1973
KOEHLER, MYRON	1972
LOCKE, LEWIS A.	1969
LUCK, WILLIAM E.	1966
LUNDY, LYNDALL L.	1968
PISANI, JOSEPH R	1972
RINCK, JOE A.	1968
SCHMIDT, HOWARD R.	1971
SULLIVAN, JAMES A.	1967
TAYLOR, HENRY T	1973
WEATHERS, RICHARD D	1972
WEBSTER, JAY L.	1970

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ARNOLD, DANIEL S.	1968
COATES, NORMAN	1967
COOPER, JACK H.	1961
EGGERS, JERRY R.	1970
EVEN, MARY J.	1971
FOLTMAN, FELICIAN F.	1950
HALL, CLARENCE E.	1969
HALL, JAMES R.	1970
HIRSCHI, HARVEY C.	1969
HOENES, RONALD L.	1970
HUMBERT 3, JOHN J.	1967
IRGANG, FRANK J.	1956
JOHNSTON, WALLACE L.	1966
KAVICH, LAWRENCE L.	1964
KELLER, LOUISE J.	1969
KOHN, DIXIE A.	1967
LA BOUNTY JR, HUGH O	1961
LINKSZ, JAMES J.	1971
LONG, GILBERT A.	1970
LYNN, WILLIAM L.	1968
MC CRACKEN, JOHN D.	1970
MONROE, ALLEN L.	1970
MORGAN, JIMMY B.	1969
O NEILL, JOHN N.	1971
PALMER, HAROLD G.	1950
PARKS, CARRELL L.	1968
ROBERTS, EDWARD R.	1971
RUTHERFORD, WILLIAM	1962
SCHAEFER, ROGER A.	1969
SHULTZ, FRED A.	1971
STAMM, HAROLD S.	1968
THOMAS, JOSEPH K.	1957
TUTHILL, RUSSELL	1970
VANDERWELL, ALLEN R.	1971
ZIEL, HENRY R.	1961

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AUTHOR	DATE
BING, KENNETH L.	1941
CHAMBERLAIN, DUANE G	1954
DAVISON, HAROLD J.	1931
DUNCAN, GLENN S.	1950
FETTERMAN, ELKIE R	1966
GOSS, ANTHONY J	1972
KEEP, ROGER L	1973
MC KENZIE, CHARLES R	1971
MOORE, ALFRED H.	1954
TAYLOR, CYRUS B.	1955
WELSH, BARTON W.	1971
YOHO, LEWIS W.	1959

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ANDERSON, EDWARD T.	1970
ASHLEY, JACKSON W.	1971
ATHANASIOU, ROBERT B	1969
AUCKER, JOHN R.	1970
BEACH, CHARLES K.	1941
BEHM, HARLEY D.	1967
BLOCK, RUDOLPH C.	1970
BORTZ, WALTER R.	1971
BOYDEN, LLOYD R.	1972
BOYER, CAROLINE K.	1966
BROADHURST, JOHN C.	1949
BROE, JOHN R.	1962
CHILSON, JOHN S.	1969
CHUANG, YING C.	1967
CLAUSEN, JOHN N.	1955
COHEN, JERRY M.	1969
COX, STEVEN G.	1968
D AMBROSIO, VINCENT	1969
DEAN, C. THOMAS	1951
DITTENHAFER, CLARENC	1972
DRAKE, LAWRENCE C.	1966
DYKE, EUGENE L.	1962
ELKINS, RICHARD L	1972
ELLIOTT, EARL S.	1967
ELMER, FRANCES W.	1967
ENSMAN, LEO M.	1957
EVANCHO, MICHAEL	1947
FARABAUGH, MARTIN P.	1966
FAUROT, LYLE M	1973
FLEMING, JOSEPH W.	1937
FRYKLUND, VERNE C.	1933
GAINES, THOMAS R.	1955
GARNER, CAREY C.	1969
GIACHINO, JOSEPH W.	1949
GOLDMAN, ROBERT C.	1971
GRIFFIN, JAMES F.	1970
HACKETT, EDWARD V.	1967
HARRIS, VIRGINIA J.	1961
HAUGO, RICHARD R.	1969
HOLLINSHEAD, MERRILL	1952
HORINE, JOHN W.	1961
HYDE, THOMAS E	1973
JARVIS, JOHN A.	1953
JELDEN, DAVID L.	1971
JENKINS, FARRELL T.	1969
JENKINS, NORMAN L.	1969
JOHNSON, MARVIN E.	1959
JOHNSON, RAY A.	1971
JONES, GUY R.	1971
KAPES, JEROME T.	1971
KOUTNIK, PAUL G.	1968
KRANTZ, MATTHEW B.	1970
KRUBECK, FLOYD E.	1954
KUNTZ, ELMER L.	1968
KURTH, EDWIN L.	1955
LACROIX, WILLIAM J.	1971
LARSON, RAYMOND H.	1951
LOWMAN, CLARENCE L.	1967
MICHIE, JACK	1968
MILLER, AARON J.	1966
MILLER, CLARENCE M.	1968
MOORE, LELAND B.	1970
NAIR, RALPH K.	1950
NEEDHAM, RAYMOND J.	1969
NESWICK, LAWRENCE G.	1971
PARKHILL, GEORGE D.	1938
PATTERSON, JOHN R.	1970
PEERSON, RICHARD H.	1969
PITTMAN, FRANK M.	1970
PODVIA, M. WAYNE	1972
QUICK, OTHO J.	1954
RALSTROM, STIG E.	1969
REHORN, GLEN E	1972

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AUTHOR	DATE
RICHARDSON, ROBERT B	1967
RISHER, CHARLES G.	1953
ROBINSON, FRANK E.	1955
RYAN, ROBERT D.	1964
SANDMAN, CHARLES W.	1969
SCHULTZ, IRWIN J.	1949
SCOTT, CHARLES P.	1943
SENTENEY, GEORGE W.	1955
SOURS, CHARLES F.	1969
STALLINGS, DANIEL N.	1969
STONE, THOMAS C.	1969
STOUGH, KENNETH F.	1968
STOUGHTON, ROBERT W.	1955
SULLIVAN, THOMAS W.	1967
THORPE, CLAIBURNE B.	1968
TORBETT, DANIEL L.	1965
TUCKER, CASEY A.	1965
UXER, JOHN E.	1967
VACEK, WILLIAM L.	1962
VAN OOT, BENJAMIN H.	1932
WIGHTWICK, BEATRICE	1949
WITT, NORMAN E.	1969
WOOLDRIDGE, ROBERT E	1961
WRIGHT, LAWRENCE S.	1954
YEAGER, LOWERY D.	1965
YOUNG, ROBERT W.	1966
ZIMMER, THEODORE A.	1969

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AUTHOR	DATE
ARONSON, NORMA	1967
BANZHAF, ROBERT A	1972
BLACK, RALPH R.	1959
CHERRY, ROGER W	1972
COX, ROBERT L.	1970
EVERETT, GEORGE A.	1972
FRANTZ JR, NEVIN R.	1967
GLOGOVSKY, RONALD J.	1970
GOETZ, ROBERT E.	1958
HANSBURG, HENRY	1935
HERR, JAMES F.	1970
HOBBS, ADDISON S.	1971
JENKINS, JOHN D.	1969
JENKINS, REESE V.	1966
KEMP, WILLIAM H.	1966
MELINE, CHARLES W.	1965
MEYERS, ALBERT	1967
MOREHEAD, JAMES C.	1971
MOSS JR, JEROME	1960
PUFAHL, VIRGIL R.	1969
RAYFORD, ERWIN W.	1967
RICE, CHARLES M. M.	1958
RICHARDS, THOMAS A	1972
RIETH, CLAUDE E.	1966
SCHEMPF, KENNETH W	1972
STRANDBERG, C. E.	1963
WEIR, THOMAS S.	1955
WILSON, MICHAEL C.	1969
YARRINGTON, HOLLIS R	1970

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ANDERSON, DONALD N.	1963
BABCOCK, JAMES G.	1969
BAKER, GLENN E.	1966
BAKER, RONALD D.	1968
BIES, JOHN D.	1972
BRENNER, CHARLES J.	1968
COLCLASER JR, ROBERT	1968
CORNWELL, RAYMOND L.	1961
EASTON, CLIFFORD W.	1971
EVEN, MARY J.	1971
FERNS, GEORGE W.	1962
FINCH, CURTIS R.	1969
HANKS, WILLIAM S.	1966
HARNEY, LEON T.	1967
HARRISON JR, PAUL E.	1955
HOLT, IVIN L.	1972
IVES, QUAY D.	1971
KOUTNIK, PAUL G.	1968
LINDEMEYER, RAY S.	1954
ROWLETT, JOHN D.	1960
SAGE, JAMES E.	1971
SCHUMM, FRED C	1972
SHEPPARD, LAWRENCE E	1967
STEPHENSON, DONALD J	1970
TEEL, DEAN A.	1967
WALLS, W. DALE	1964
WEHRLI, ROBERT	1968

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AUTHOR	DATE
CHARLESWORTH, KENNET	1968
ELLINGTON, MARK	1936
FRYE, BILL J.	1971
GAVIN, GORDON O.	1968
GUNDERSON, ORLEY D.	1971
HAUER, NELSON A.	1949
LAPPIN, ALVIN R.	1958
LEAVITT, WILLIAM C.	1969
LINDAHL, DONALD G.	1971
MARBURGER, EDWARD F.	1948
MC NEILL, JOSEPH G.	1970
MILLER, JACK D.	1971
MOONEY, JAMES J.	1967
NIELSEN, ERWIN E.	1969
PREITZ, CLARENCE H.	1969
SPAZIANI, RICHARD L.	1972
TATE, JOHN B.	1971
WIGGS, GARLAND D.	1971

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AUTHOR	DATE
COLLONS, RODGER C.	1967
HAUENSTEIN, ALBERT D	1966
MAGOWAN, ROBERT E.	1967
TAGGART, LEO R.	1953

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AUTHOR	DATE
BAKER, GLENN E.	1966
BLEEKE, MILTON H.	1968
DUFFY, JOSEPH W.	1958
HANSEN, PHILLIP W.	1970
ILOTT, JOHN F. D.	1969
KLEHM, WALTER A.	1937
PORTER, SAM R.	1962
WEST, WILLIAM E.	1969

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AUTHOR	DATE
AGUIRRE, EDWARD	1966
ARMSTRONG, WILLIAM H	1967
BALLARD, JOHN R.	1966
BALZER, EUGENE W.	1972
BECK, JOHN R.	1964
BECKHAM, JOE W.	1969
BENSEN, JAMES M.	1967
BENSON, M. J.	1967
BERTRAND, CLINT A.	1964
BOCKMAN, DAVID C.	1971
CAMPBELL, GORDON	1969
CHRISMAN, JOSEPH P.	1970
COLLIER, JAMES A	1973
DANNENBERG, RAYMOND	1965
GALLINELLI, JOHN W.	1970
GIERKE, EARL W.	1970
GLAZENER, EVERETT R.	1958
GRIFFITH, JOHN L.	1967
HAHN, MARSHALL S.	1967
HANCOX, FREDERICK J.	1969
HARMON, JAMES S.	1969
HASKELL, ROGER W.	1969
HEYEL, CLARENCE L.	1967
HOCH, EMIL H.	1969
HOUSEHOLDER, DANIEL	1963
LEASE, ALFRED A.	1964
LUNDY, LYNDALL L.	1968
MANCHAK, PAUL J.	1965
MC NAMARA, JAMES F.	1970
MOEGENBURG, LOUIS A.	1969
NAROFF, ARNOLD	1971
NORTON, ROBERT E.	1967
O HARA, JAMES S	1972
PHILLIPS, THOMAS G.	1971
RICHARDS, KENVYN B.	1970
ROKUSEK, H. J.	1964
RUGGLES, STANFORD D.	1969
SEAL, MICHAEL R.	1969
SHULL, HOWARD I.	1969
SIMICH, JACK	1965
SMITH, CARRELL L.	1969
SMITH, FREDDY J.	1970
STEPHENS, KENT G	1972
STILLMAN, NEIL J	1972
TIFT, KATHERINE F.	1971
WARNER, RICHARD A.	1969
WEFFENSTETTE, WALTER	1965
YFF, JOOST	1965

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AUTHOR	DATE
ACHILLES, CHARLES M.	1967
ALLEN, DAVID	1962
BARTEL, CARL R.	1959
BELL, CLAUDE A.	1964
HAHN, BRUCE J.	1953
HAMMOND, HOWARD R.	1971
HORTON, GEORGE R.	1967
JACKSON, PETER A.	1965
JOHNSON, ELOUISE E.	1967
KINZY, DONALD W	1973
SEARS JR, WOODROW M.	1971

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AUTHOR	DATE
BEDWELL, NORMAN W.	1951
BIBB, HERMAN L.	1952
BRENHOLTZ, HAROLD R.	1957
CANADA, BRIAN L.	1972
COX, STEVEN G.	1968
FURIA, JOHN J.	1930
JOHNSON, ELOUISE E.	1967
JORDAN, THOMAS F.	1942
PAYZER, MARVIN F.	1954
RUBIN, MORRIS M.	1950
SCHURE, ALEXANDER	1950
SHRADER, ROBERT F.	1967
UNDERHILL, CHARLES M	1968

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AUTHOR	DATE
BROWNRIGG, JERRY R.	1962
CALHOUN, MARJORIE R.	1970
DRAKE, LAWRENCE C.	1966
DREW, ALFRED S.	1962
EVEN, MARY J.	1971
FIELDS, OWEN F	1972
FROELICH, DONALD M.	1970
HANSBURG, HENRY	1935
HOUSEHOLDER, DANIEL	1963
HOUSKA, JOSEPH T.	1971
LEASE, ALFRED A.	1964
LOPEZ, DANIEL C.	19
MASON, EMMETT E.	1969
MC CAIN, JERRY C.	1959
MC KELL, WILLIAM E.	1970
MILLER, WILBUR R.	1960
RANDLEMAN, ROBERT R.	1961
RICHARDS, KENVYN B.	1970
WEBER, ROBERT D.	1971
WOLFE, JAMES M.	1970
YOUNG, TALMAGE B.	1953

RECR

AUTHOR	DATE
BIEDLER, JOHN S.	1958
FARNING, MAX C	1972
KAUMEHIEWA, ALSON I.	1969
PATE JR, DOVE H.	1970

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AUTHOR	DATE
UNDERHILL, CHARLES M	1968

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AUTHOR	DATE
CHAPMAN, GEORGE L	1972
CLARK, CHARLES G	1972
CONLEY, FRANKLIN	1968
CRIST, LEROY	1961
ELKINS, RICHARD L	1972
EVERSOLL, ROBERT I.	1971
FOLEY JR, DENIS J.	1967
FRISBY, RUSSELL C.	1968
GERBRACHT, CARLTON J	1949
HAGEMEYER, RICHARD H	1960
HULLMAN, DON H.	1971
JAHRMAN, QUAIN K.	1964
KREJOIE, ROBERT V.	1968
LARSON, IRVING W.	1969
MALLARY, BENJAMIN E.	1932
MEHALLIS, GEORGE	1963
MELLMAN, ROBERT A.	1957
MESSERSCHMIDT, DALE	1967
MILAN, JOSEPH E	1972
MINKEVICH, GEORGE	1972
NEUFELD, JACOB A.	1968
O DELL, ROBERT D.	1963
RESSLER, RALPH	1966
RUTHERFORD, WILLIAM	1962
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SENTENEY, GEORGE W.	1955
SIMONS, ROBERT M.	1969
SIRO, EINAR E.	1949
SOURS, CHARLES F.	1969
UBELACKER, SANDRA C.	1971
VAN BENSCHOTEN, RAYM	1971
WALDORF, ROBERT J.	1971
WALSH, RAYMOND J.	1965
WEIR, ELDON L.	1970
WHITE, DAVID L.	1973
WIERSTEINER, SAMUEL	1970
WILSON, ROGER J.	1970
WINSEMAN JR, ALBERT	1969
WOLD, KENNETH M.	1961
WOOD, GRANT R.	1970

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AUTHOR	DATE
BAILEY, GERALD D.	1964
BRITT, ROBERT D.	1966
EPSTEIN, JACK F.	1971
KING, THOMAS G.	1958
LINDBECK, JOHN R.	1958
MAC LEAN JR, C. B.	1963
MARTINEZ, LEONARDO	1972
NELSON, ORVILLE W.	1967
OSBORN, JIMMIE D	1972
ROSS, RAYMOND J.	1966
SCHROEDER, PAUL E	1973
TALKINGTON, JOE E.	1962
WOODS, WILLIAM H.	1971

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AUTHOR	DATE
ANDERSON, KERMIT P.	1967
BECKHAM, JOE W.	1969
BIRNBACH, SIDNEY B.	1948
BRACEY, HYLER J.	1969
BURGHARDT, WILLIAM F	1950
CHARLESWORTH, KENNET	1968
COBURN, JAMES M.	1969
COMSTOCK, THOMAS W.	1969
CRESSMAN, PAUL L.	1934
ESTABROOKE, EDWARD C	1939
ESTABROOKE, PAUL L.	1939
FUGAL, GLEN R.	1950
GILLASPY, ROY E	1973
GILLILAND SR, LONNIE	1955
HAGGLUND, GEORGE S.	1966
HESS, HARRY L.	1969
HICKS, CAROL E	1973
HOPPER, CHARLES H.	1971
HUGHES, WAYNE P.	1942
HUMBLE, MILFORD K.	1937
KASSAY, JOHN A.	1970
KIGIN, DENIS J.	1959
LINHARDT, RICHARD E.	1971
LOCKE, LEWIS A.	1969
LOVELESS JR, SIDNEY	1969
NICHOLS JR, GEORGE V	1971
PINCKNEY, CHARLES W.	1953
PRUST, ZENAS A.	1964
TURNER, WILLIAM G	1973
WALLACE, NORMAN E.	1968
WHITE, CHARLIE H	1972
WILLIAMS, WILLIAM A.	1959

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ADAMS, JOHN V.	1947
BUXTON, ROBERT E.	1960
CHAMPION, GEORGE	1965
COLEMAN, WAYNE D.	1967
DOWNS, WILLIAM A.	1968
DRISCOLL, EDWARD F	1964
EISS, ALBERT F.	1954
ENGELBREKTSON, SUNE	1961
GERNE JR, TIMOTHY A.	1967
GRIFFIN, RAYMOND V.	1965
GROTE, CHARLES N.	1960
JENKINS, REESE V.	1966
KLEIN, CHARLES T.	1942
KLEINBACH, MERLIN H.	1959
KOHLER, RICHARD C.	1951
LJOSTAD, RODNEY A.	1965
NOLL, ROBERT F.	1967
PERSHERN, FRANK R.	1967
REMICK, EDWARD L.	
RONEY, MAURICE W.	1964
SHOEMAKER, BYRL R.	1957

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SNITZ, RUBEN H.	1931

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AKEY, WAYNE W.	1952
ATHANASIOU, ROBERT B	1969
BECK, RICHARD W.	1971
BENSON, WILLARD A.	1959
CHAPMAN, GEORGE L	1972
CLARK, CHARLES G	1972
COHEN, JERRY M.	1969
CUMMINS, CARL C.	1957
DAUGHERTY, RONALD D.	1971
DENT, JAMES A	1972
DODGE, ARTHUR F.	1935
DOUTT, RICHARD F.	1965
EHRENBORG, JOHN D.	1963
FARNING, MAX C	1972
FAUROT, LYLE M	1973
FLEMING, JOSEPH W.	1937
FOLEY JR, DENIS J.	1967
FULLER, FOSTER D.	
HAKANSON, JOHN W.	1967
HENRY, GEORGE F.	1954
HULLMAN, DON H.	1971
JAHRMAN, QUAIN K.	1964
JARVIS, JOHN A.	1953
JOHNSON, MARVIN E.	1959
JOHNSON, RUFUS G.	1949
JOHNSTON, WALLACE L.	1968
KETCHAM, GEORGE W.	1963
KUNTZ, ELMER L.	1968
MAC DONALD, MANLEY E	1944
MALLARY, BENJAMIN E.	1932
MC KENZIE, CHARLES R	1971
MOUTOUX, ALFRED C.	1948
NEUFELD, JACOB A.	1968
O DELL, ROBERT D.	1963
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SIRO, EINAR E.	1949
SULENTIC, MILO N	1973
TRUDEAU, TERENCE J	1972
VYAS, PREMILA H.	1967
WHEELER, DAVID N	1972
WILMOTT, JOHN N.	1941
WINDLE, JIM L.	1968
WINSEMAN JR, ALBERT	1969
WITT, NORMAN E.	1969
WOLD, KENNETH M.	1961
WOOD, GRANT R.	1970
YUNG, JOHN E.	1965

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ABITIA, FREDDIE	1971
BLACK, RICHARD W.	1973
BRAUN, ROBERT W.	1971
CARPENTER, THOMAS E.	1971
HARRIS, JAMES N.	1969
HARRISON JR, PAUL E.	1955
JANECZKO, ROBERT J.	1971
KERWOOD, ROBERT V.	1967
LANDECKER, LOUIS	1969
LINNICK, IDA	1949
MC GINNIS, PATRICK T	1972
MINKEVICH, GEORGE	1972
NEE, JOHN G	1972
SIEVERT, NORMAN W.	1971
SIMICH, JACK	1965
WASDYKE, RAYMOND G.	1971
WERTHEIM, JUDITH B.	1971
WILBER, GEORGE O.	1941
WONG, LA VERNE B	1973
WOOLF, WILLIAM D	1972

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ALTUS, DAVID M.	1972
BRUNTLETT, JOHN E.	1973
DU VALL, JOHN B	1972
HILDEBRANDT, ROBERT	1973
KOEHLER, MYRON	1972
RANDOLPH, JAMES R.	1972
RUMMELL, WINFIELD R.	1971

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ALLEN, JOHN C.	1969
ARONSON, NORMA	1967
BAKER, NORMAN [illegible].	1971
BECKER, DEROLD W.	1969
BENDER, MICHAEL	1971
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
BORTZ, RICHARD F.	1967
BOXX, WILLIAM R.	1972
BROWN, JAMES T	1973
CALDER JR, CLARENCE	1964
CHASTAIN, GARY K.	1972
CLENDENNING, LEE R.	1972
COLE, CARRELL D	1972
CROY, FLOYD E	1972
CUSHING, NELSON N.	1971
D AMBROSIO, VINCENT	1969
DEADY, JOHN J.	1970
DEAN, ROBERT D.	1959
DENOVA, CHARLES C.	1968
DOTY, CHARLES R.	1968
EASTON, CLIFFORD W.	1971
EDSTROM, CARL A	1972
ESTLE, EDWIN F.	1966
FAGAN, RAYMOND E. B.	1954
FLUG, EUGENE R.	1967
GEDEON, DAVID V.	1971
GIMBEL, ARMIN F.	1953
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HANSON, ROBERT R.	1970
HARRELL, WILLIAM R	1972
HENAK, RICHARD M.	1971
HEYEL, CLARENCE L.	1967
HOFER, ARMAND G.	1963
HOUSE, ELAINE	1970
HUDSON, DONALD W.	1972
HURLEY, CARL E.	1971
IRVINE, FLEET R.	1968
JAGEMAN, LARRY W.	1968
JANECZKO, ROBERT J.	1971
JOHNSON, RAY A.	1971
JOLLY, FRANK H.	1970
KASSAY, JOHN A.	1970
KIEFT, LEWIS D.	1970
LARUE, JAMES P.	1968
LICHTBLAU, LEONARD R	1958
LINDAHL, LAWRENCE G.	1944
LOCKETTE, RUTHERFORD	1956
LOW, FRED G.	1963
LUTZ, RONALD J.	1969
MANCHAK, PAUL J.	1965
MANNION, EDMUND J.	1972
MARTIN, GORDON E	1972
MARTINEZ, PETE	1970
MC KENNA, CONSTANCE	1971
MEERS, GARY D	1972
MEYER, JOHN M.	1969
MIDDLETON, WILLIAM H	1962
MILLER, JAMES A.	1971
MILLS, BOYD C.	1967
MOORE, BILLY M	1973
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NISH, DALE L.	1967
NORTON, ROBERT E.	1967
OAKS, MERRILL M.	1970
OLSON, DAVID O.	1969
ORR, WILLIAM H.	1970
REBHORN, ELDON A.	1972
RICHARDS, FREDDIE L	1972
RICHARDSON, ROBERT B	1967
RIDLEY JR, WILLIAM H	1970
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SCHACHT, ROBERT C.	1971
SEIGLER, CLAUDE I.	1970
SEGUIN, ARMAND M	1973
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
STANTON, MILDRED B.	1938
STEMMER, ROLAND C	1973
SUESS, ALAN R.	1962
SWANSON, RICHARD A.	1968
THOMAS, MAURICE G.	1968
WAISNER, GARY L.	1970
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WOOD, MILTON E	1973
WORTHINGTON, ROBERT	1958

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AUTHOR	DATE
ANDERSON, W. C.	1954
BEED, GALER W.	1970
CHRISTOFFEL, FREDERI	1960
DETWILER SR, WAYNE L	1971
DRAWDY, LARRY A.	1971
DRAZEK, STANLEY J.	1950
HUSS, WILLIAM E.	1951
JOHNSON, VERNER B.	1966
LEAVITT, WILLIAM C.	1969
MALEY, DONALD	1949
MILLS, EARL S.	1971
POLESZAK, LEONARD J.	1969
SARGENT, WILLIAM T.	1956
THOMAS, CHARLES L.	1964

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BAKAMIS, WILLIAM A.	1951
BAUGHER, RICHARD W.	1972
BAYNE, GEORGE K.	1972
BIKKIE, JAMES A.	1973
BLANTON, LLOYD H.	1970
BOWDOIN, PAUL	1966
BRANDON, GEORGE L.	1952
CHRISTOFFEL, FREDERI	1960
COTRELL, CALVIN J.	1960
CRESSMAN, PAUL L.	1934
CRUDDEN, PAUL B.	1944
EDWARDS, JOHN T.	1970
EISENBERG, WILLIAM L	1947
EISS, ALBERT F.	1954
FEGAN, HAROLD J.	1971
FOLTMAN, FELICIAN F.	1950
GILBERT, HAROLD G.	1955
HAMMACK, CHARLES R.	1967
HEGER, ROBERT J.	1968
JOHNSON, VERNER B.	1966

KOHRAM, GEORGE E.	1952
KU, GEORGE C	1972
LEAVITT, MAX V	1972
LESTER, SEELIG L.	1944
LINE, JOHN D.	1971
LONG, GILBERT A.	1970
LOVELESS JR, SIDNEY	1969
LUFF, ANDREW C.	1955
MAGISOS, JOEL H.	1968
MALIK, JOSEPH A.	1968
MANNING, GEORGE E.	1971
MANSFIELD, WESLEY B.	1970
MARSHALL, CHARLES R.	1971
MC CRACKEN, JOHN D.	1970
MC ROBBIE, J. M.	1963
MERTZ, OTTO	1954
MICHEELS, WILLIAM J.	1941
MILLER, JACK D.	1971
MORRISEY, THOMAS J.	1965
OLIVER, WILMOT F.	1967
PARNES, SIDNEY J.	1954
PEARSON, WILLIAM W.	1967
PENDLETON, JOHN T	1973
PETERS, DONALD F.	1959
POLK, HAROLD J.	1969
RICE, DICK C.	1966
RIETH, CLAUDE E.	1966
RIMLER, GEORGE W.	1969
ROWEN, MILTON S.	1969
SARGENT, WILLIAM T.	1956
SAWYER, DAVID E.	1972
SCHANK, KENNETH L.	1965
SCHOEPPLER, JACOB	1958
SCHORLING, HORACE O.	1950
SCHOTT, WILLIAM J.	1954
SECHREST, CHARLES H.	1953
SECKENDORF, ROBERT S	1960
SMITH, FARMER S.	1969
SMITH, IRVING G.	1969
SOULE, DAVID H.	1966
STANGER, NORMAN R.	1967
STEEB, RALPH V.	1959
STEVENSON, JAMES E.	1953
STEWART, WILLIAM J.	1968
TATE, HAROLD S.	1951
TAXIS, DAVID O.	1962
TOBIN, GERALD W.	1972
TUXHORN, SCOTT E.	1967
VINEYARD, BENNY S.	1962
WALKER, LLOYD R.	1946
WARD, DARRELL L.	1971
WASDYKE, RAYMOND G.	1971

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ALLEN, DELL K	1973
BANZHAF, ROBERT A	1972
BARICH, DEWEY F.	1961
BEATTY, CHARLES J.	1967
BLOCK, MURRAY H.	1953
BRAME, WILLIAM E.	1967
BRUECKMAN JR, JOHN C	1969
CALERO, THOMAS M	1972
CALEY, PAUL C.	1969
COLE, DARRELL D	1972
COLLIER, JAMES A	1973
CUMMINGS, LAWRENCE J	1969
FECIK, JOHN T.	1970
FOSTER, ROBERT J.	1969
FRITZ, ROBERT C.	1960
GAILEY, DAVID S.	1969
GALLUP, LELLAND L.	1970
GAUTHIER, MICHAEL K	1972
GRAY, THOMAS E.	1970
GUENTZLER, WILLIAM D	1973
GYSLER, RANDOLPH L.	1971
HALFIN, HAROLD H	1973
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HANSEN, JOHN R.	1970
HAUSER, ROGER E.	1971
HONEYCUTT, BILLY J	1973
HUNTER, ROBERT F.	1970
JENKINS, REESE V.	1966
KAPLAN, WILLIAM A.	1970
KEIM, LAWRENCE	1966
KEMELGOR, BRUCE H	1973
KRAFT, RICHARD H.	1967
KURIEN, CHEMPALATHAR	1967
LARSON, DELMAR L.	1964
MANGANELLI, FRED D.	1959
MAUER, DONALD E.	1966
METZLER, JOHN H.	1970
MIDILI, JOHN A.	1970
MILLER, MARK E.	1967
MONGERSON, MARTIN D.	1968
MORGAN, DARYLE W.	1968
NEUBAUER, GERHARDT W	1956
OLSON, DELMAR W.	1957
ORLANDO, FRANK J	1972
OTTERSON, PEDER A.	1969
PIERSALL, ARNOLD C.	1964
POELZER, IRENE A	1972
CUIER, GEORGE T.	1969
RAY, REX E.	1966
RELYEA, GLADYS M.	1937
RINEHART, RICHARD L.	1966
RUNNALLS, JAMES J.	1965
SANDBERG, NINA M.	1968
SHARMA, BALDEV R.	1967
SHEPARD, JON M.	1968
SIMONS, JEROLD J.	1967
SONNY, JACOB	1971
STADT, RONALD W.	1962
STROM, IRVING E.	1970
TREGILGUS, EARL P.	1954
VAN GIGCH, JOHN P.	1968
WALLACE, DONALD F	1972
WRIGHT, JERAULD B.	1969
ZAREISN, SOLEIMAN	1969

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BARON, ANDREW W.	1968
BETTIS, LLOYD E.	1971
BURSE SR, LUTHER	1969
CAIN, JOHN N.	1970
CAMPBELL, GORDON	1969
CHEEK, GERALD D	1972
CHRISMAN, JOSEPH P.	1970
DAWSON, KENNETH E.	1965
DILIBERTO, MENNO	1968
EHRENBORG, JOHN D.	1963
FAGAN, BERNARD T.	1970
FERNS, GEORGE W.	1962
FINKELSTEIN, ABRAHAM	1959
FRANCHAK, STEPHEN J.	1971
GAINES, THOMAS R.	1955
GIACHINO, JOSEPH W.	1949
GIANINI, PAUL C.	1968
GREENWALD, MARTIN L	1972
GROTE, CHARLES N.	1960
GRUNWALD, WALTER	1968
HAHN, MARSHALL S.	1967
HAMMACK, CHARLES R.	1967
HARRISON JR, PAUL E.	1955
JAMES, CALVIN E.	1963
JANZEN, JOHN W.	1971
JENKINS, JOHN D.	1969
JONES, CHARLES I.	1967
KAGY, FREDERICK D.	1959
KOHLER, RICHARD C.	1951
LOEPP, FRANZIE L.	1970
MANSFIELD, ROBERT T.	1959
MARTIN, GORDON E	1972
MONROE, H. B.	1960
MORGAN, J. B.	1961
MUSGROVE, WILLIAM R.	19
NELSON, HILDING E.	1962
NELSON, HOWARD F.	1953
OAKS, MERRILL M.	1970

OLIVER, WILMOT F.	1967
ORR, WILLIAM H.	1970
PFAHL, ALVIN K.	1970
POLESZAK, LEONARD J.	1969
POWERS, G. PAT	1961
PREWITT, ROGER W	1973
RALSTROM, STIG E.	1969
RAY, REX E.	1966
REBHORN, ELDON A.	1972
REESER, GEORGE W.	1971
REPP, VICTOR E.	1970
RISHER, CHARLES G.	1953
ROKUSEK, H. J.	1964
RUITER, WILLIAM W.	1971
RUMMELL, WINFIELD R.	1971
SCHERER, HARLAN L.	1960
SEEFIELD, KERMIT A.	1949
STANFIELD, FOSTER A.	1971
SULLIVAN, FRANK V.	1964
SUMTER, PAUL E.	1969
SWERDLOW, ROBERT M.	1969
TAYLOR, HENRY T	1973
WALKER, JOE W.	1970
WARZECHA, EVERETT R.	1972
WILLIAMS III, WALTER	1963

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ANDERSON, EDWARD T.	1970
ARMSTRONG, KENNETH E	1971
ASHLEY, JACKSON W.	1971
BECK, JOHN R.	1964
BIEWALD, EDWARD C.	1969
BLUM, ROBERT E.	1965
BOX SR, MARSHALL R.	1967
BRAUN, ROBERT W.	1971
BROWN, WALTER E.	1971
BURCETTE JR, WALTER	1955
BYROM, JOHN M.	1957
CASSIDY, EDWARD A.	1953
CHAMBERLAIN, DUANE G	1954
CLAWSON, LA VERE E.	1967
COBURN, JAMES M.	1969
COLGAN, FRANCIS E.	1967
COLLONS, RODGER D.	1967
COMER, JOHN C.	1970
COZZENS, CHARLES R.	1965
CRAWFORD, JOHN E.	1941
DAINES, JAMES R.	1968
DEMPSEY, DON G.	1972
DILIBERTO, MENNO	1968
DUENK, LESTER G.	1966
EHRENBORG, JOHN D.	1963
FACE, WESLEY L.	1963
FAUROT, LYLE M	1973
FLUEGGE, LYNN R.	1972
GALLINGTON, RALPH O.	1947
GISRIEL, AUSTIN E.	1959
GOLDMAN, ROBERT C.	1971
GRANEY, MAURICE R.	1942
GUTH, THEODORE E	1973
HACKETT, EDWARD V.	1967
HARRIS, RICHARD	1970
HARRIS, ROBERT C.	1970
HASH, JOHN A.	1969
HENDRIX, WILLIAM F.	1967
HENNIG, JAMES F.	1970
HERRING, TOC H.	1962
HILL, EDWIN K.	1968
HILL, JOSHUA	1972
HOFER, JARREL	1969
HOLM, MELVIN G.	1972
HULLE, WILLIAM A.	1972
HYDE, THOMAS E	1973
JOHNSON, DOUGLAS H.	1969
KOUTNIK, PAUL G.	1968
LANMAN, RICHARD W.	1953
LEMONS, CLIFTON D.	1965
LOEPP, FRANZIE L.	1970
LOPEZ, DANIEL C.	19
LYONS, RICHARD A.	1969
MASSEY, HAL	1965
MC VICKER, HOWARD E.	1970
MOORE, BILLY M	1973
MORGAN SR, LEO D.	1966
MUDGETT, ALBERT G.	1958
MURPHY, JAMES O.	1972
NEWKIRK, LOUIS V.	1929
NYE, PHARES S	1972
PANDOLPH, EUGENE J	1972
PERKINS, NEAL B.	1962
PETER, RICHARD F.	1970
PRATZNER, FRANK C.	1969
SALTEN, DAVID G.	1944
SANDMAN, CHARLES W.	1969
SHORE JR, THOMAS C.	1970
SILVER, HARVEY A.	1967
STANGL, OTTO A.	1968
STEPHENS, GEORGE T.	1969
STOKES, VERNON L.	1971
SULENTIC, MILO N	1973
SWANSON, RICHARD A.	1968
TURNER, MERVYN L.	1968
WAKS, SHLOMO	1973
WALLACE, NORMAN E.	1968
WARRICK, GLENN D.	19
WIGHTWICK, BEATRICE	1949
WILCOX, T. GLADE	1957
WILKINSON, GEORGE B	1972
WRIGHT, LAWRENCE S.	1954
WYNN, PHILIP D.	1970
YOUNG, DARIUS R.	1968

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AUTHOR	DATE
BONDE, ROBERT G.	1964
DOUTT, RICHARD F.	1965
HANSEN, RUSSELL G.	1964
LAPPIN, ALVIN R.	1958
LINTON, JOHN A.	1951
SHEFFIELD, EVERETT A	1969
SMITH, EARL M.	1971
VAN TASSEL, RAYMOND	1948

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AUTHOR	DATE
ALLEN, WILLARD A.	1963
BATES, IVAN W.	1971
COBURN, JAMES M.	1969
KLEINTJES, PAUL L.	1953
LOCKE, LEWIS A.	1969
MARBURGER, EDWARD F.	1948

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AUTHOR	DATE
AL-BUKHARI, NAJATI M	1968
ANDERWALD, CARL J.	1947
ATTEBERRY, PAT H.	1954
BADER, LOIS	1932
BAKER, ALFRED E.	1943
BASSERI, JAMSHID	1970
BEDWELL, NORMAN W.	1951
BIBB, HERMAN L.	1952
BOXX, WILLIAM R.	1972
BROPHY, JOHN M.	1947
BROTHERTON, WILLIAM	1964
BROWN, WALTER C.	1954
COCHRAN, GEORGE C.	1967
CRUDDEN, PAUL B.	1944
CUTLER, THEODORE H.	1948
DANAHER, EUGENE I.	1946
EARHART, CECILIA R.	1946
EVANCHO, MICHAEL	1947
FAULDS, VINCENT R.	1956
FLAHERTY, HUGH	1944
FOLTMAN, FELICIAN F.	1950
FRYE, ROYE M.	1963
FRYKLUND, VERNE C.	1933
GHEEN, W. LLOYD	1970
GOSSAGE, LOYCE C.	1967
GRANDCHAMP, ROBERT J	1971
HACKETT, EDWARD V.	1967
HALL, JAMES F.	1954
HAMILTON, ALLEN T.	1941
HARPER, HERBERT D.	1934
HASKELL, ROGER W.	1969
HEARN, ARTHUR R.	1948
HEEP, RICHARD H.	1939
HUBBARD, LOUIS H.	1930
IACOBELLI, JOHN L.	1969
JOHNSON, MARVIN E.	1959
JULIAN, LESTER J.	1953
KAPLAN, HAROLD	1956
KURTH, EDWIN L.	1955
LAND, SAMUEL L.	1931
LEVENSON, WILLIAM B.	1937
LINDAHL, LAWRENCE G.	1944
LITTLE, RICHARD L.	1968
MC DOWELL, LEONARD C	1964
MUSGROVE, WILLIAM R.	19
NICHOLS, JACK D.	1970
OGLESBY, JAMES R	1972
OGUNNIYI, OMOTOSHO	1969
PAWELEK, ALAN R.	1950
PEDERSEN, GEORGE L.	1957
PORTER, HAROLD W.	1948
PRICE, DENNIS H.	1955
RELYEA, GLADYS M.	1937
ROSENQUIST, BARBARA	1971
SHEFFIECK JR, CHARLE	1969
SMITH, FARMER S.	1969
SNOW, JOHN W.	1966
SORENSEN, RONALD L.	1964
STEGEMAN, ARTHUR L.	1957
TIERNEY, WILLIAM F.	1952
TREGILGUS, EARL P.	1954
TURNER, ERWIN	1958
WALKER, LLOYD R.	1946
WHITE, STROLLER T.	1967
ZOOK, WAYNE H.	1968

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AUTHOR	DATE
GUNDERSON, B. HARRY	1949

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AUTHOR	DATE
DAS, RADHA C.	1950
GERBRACHT, CARLTON J	1949
GILLILAND SR, LONNIE	1955
GREER, JOHN S.	1967
HALL, CLYDE W.	1953
HAMILTON, ALLEN T.	1941
HAMMOND, ROBERT G.	1956
KRUMBIEGEL, WALTER O	1955
LAMBERT, JAMES H.	1940
LOUGHLIN, RICHARD L.	1948
MAC LEAN JR, C. B.	1963
MAHONEY, JAMES H.	1956
MC CLEARY, JOSEPH L.	1967
MILLER, DUDLEY B.	1965
MONROE, LYNNE C.	1939
OSBURN, BURL N.	1939
RINEHART, RICHARD L.	1966
ROBINSON, JAMES W.	1967
SAYOVITZ, JOSEPH J.	1955
SCHORLING, HORACE O.	1950
SHAFER, CARL I.	1961
SIMONS, ROBERT M.	1969
SMITH, HERBERT E.	1940
SREDL, HENRY J.	1964
STREICHLER, JERRY	1963
STRONG, MERLE E.	1958
TATE, HAROLD S.	1951
TRICHE JR, ANDREW	1933
USDANE, WILLIAM M.	1955
VALENTINE, IVAN E.	1969
WEBSTER, JAY L.	1970
WHITESEL, JOHN A.	1940

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ALLEN, JAY M.	1967
ANDERSON, RAY N.	1932
BARNETTE JR, W. L.	1949
BARTLETT, WILLIS E.	1967
BEACHAM, HERBERT C.	19
BERTRAND, CLINT A.	1964
BLACK, DONALD E.	1970
BLAKELEY, THOMAS A.	1949
BONNER, HAROLD S	1972
BRITT, ROBERT D.	1966
BURRIS, WAITUS R.	1967
CASNER, DANIEL	1950
ELMER, FRANCES W.	1967
FAWCETT, CLAUDE W.	1943
FEATHER, DON B.	1949
HAGGLUND, GEORGE S.	1966
HANEY, PHILIP H.	1949
HANSON, DURWIN M.	1956
HUTCHERSON, ETHEL M.	1966
JONES, HOMER W	1973
KAUFMAN, CHARLES W.	1967
KOCH, NORBERT	1951
KUNTZ, ELMER L.	1968
LANGDON, CHARLES W.	1967
LOUGHLIN, RICHARD L.	1948
LOWMAN, CLARENCE L.	1967
LYMAN, JAY R	1972
MC KECHNIE, GRAEME H	1966
NICHOLS, JACK D.	1970
NILSON, KENNETH	1931
OGLESBY, JAMES R	1972
OSBURN, BURL N.	1939
PRUSKI, JOHN	1958
SELF JR, JOHN M.	1967
THIEL, DONALD W.	1959
THORNE III, EDWARD H	1972
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VERMEULEN, ROBERT	1968

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BURSE SR, LUTHER	1969
COOMER, JERRY W.	1971
EIDE, ARVID R	1973
HEPLER, EARL R.	1957
HORBAKE, R. LEE	1942
JACOBSEN, ECKHART A.	1957
JOHNSON, FRANK F.	1971
KIKER, CHARLES M	1973
LACROIX, WILLIAM J.	1971
LANDECKER, LOUIS	1969
LONDON, HOYT H.	1934
MEERS, GARY D	1972
RICHARDS, MAURICE F.	1950
ROUTH, JERRY D.	1970
RUSSELL JR, JAMES A.	1967
SCHUMM, FRED C	1972
SEAL, MICHAEL R.	1969
STAMBOOLIAN JR, JOHN	1972
WALGREN, FLOYD B.	1971
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WILLS, VERNON L.	1965

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BAIER, JON W	1973
BAILEY, MILTON J.	1968
BISHOP, JAMES R.	1970
BLOCK, MURRAY H.	1953
CHUMBLEY, JOHN D	1972
CROUCH, J. PAGE	1968
DENT JR, JACK E	1972
EICHER, ROBERT S.	1968
EVANS, WILSON A.	1954
FORBES, ROY H.	1970
FRANK JR, HARRY E.	1968
GIBSON, CHARLES H.	1968
GRAMBERG, MERLYN L.	1971
GRAY, KENNEY E.	1970
HEATH, JAMES L.	1967
HILL, FREDERICK W.	1942
HOSTETLER, IVAN	1945
JACOBY, WALTER	1961
JOHNSON, DUANE A.	1972
JOHNSON, RAYMOND C.	1971
KHOSHZAMIR, FIROUZ	1971
LANG, EDWARD H.	1942
MASON, WILLIAM H.	1970
MEHAIL, SPIRO	1971
MEISNER, ROBERT G.	1967
MELLINGER, BARRY L.	1972
MICHELSON, EINO S.	1956
MILAM, THOMAS R.	1968
MILLER, JACK D.	1971
MONTELLO, PAUL A.	1968
OGLE, LEWIS W.	1971
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SCHMIDT JR, FRED J.	1941
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TOBIN, GERALD W.	1972
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AUTHOR	DATE
ASHCRAFT, NORMAN C.	1968
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MONROE, ALLEN L.	1970
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PERKINS, NEAL B.	1962
ROSS, RAYMOND J.	1966
SCHMIDT JR, FRED J.	1941
SMITH, IRVING G.	1969
VAN DYKE, ARVID W.	1970

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AUTHOR	DATE
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BURGETT, DONALD C.	1970
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CORFIAS, JOHN C.	1967
FOWLER, HARMON R.	1970
GARRETT, ARTHUR M.	1971
GIBSON, CHARLES H.	1968
GRAMBERG, MERLYN L.	1971
HEATH, JAMES L.	1967
JOHNSON, RAYMOND C.	1971
KOCH, NORBERT	1951
OLSEN, EUGENE A.	1968
PARRY, ERNEST B.	1968
POWELL, PAUL E.	1954
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SHELTON, JOHN A.	1968

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BACKUS, KERBY D.	1968
BAIER, JON W	1973
HEATH, JAMES L.	1967
HUMBERT 3, JOHN J.	1967
JOHNSON, RAYMOND C.	1971
MAHONEY, JAMES H.	1956
MASON, WILLIAM H.	1970
MC ROBBIE, J. M.	1963
MICHEELS, WILLIAM J.	1941
MOSLEY, SAMUEL N.	1970
ROSS, RAYMOND J.	1966
RUSSELL, GENE H.	1970
SCHERER, HARLAN L.	1960
SEEFIELD, KERMIT A.	1949
SMITH, IRVING G.	1969
STEEB, RALPH V.	1959
STEPHENSON, LESLIE E	1958
STEVENSON, JAMES E.	1953
TAXIS, DAVID O.	1962
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VAN DYKE, ARVID W.	1970

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RESNICK, HAROLD S.	1970
ROWNTREE, URWIN	1951
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AUTHOR	DATE
CHRISMAN, JOSEPH P.	1970
EVANCHO, MICHAEL	1947
HARRELL, WILLIAM R	1972
HAUER, DONALD E.	1966
MORGAN, DARYLE W.	1968
NEWTON, ROBERT E.	1970
PONTYNEN, BURTON A	1973
ROSIN, WILLIAM J.	1969
SEAL, MICHAEL R.	1969
SERGEANT, HAROLD A.	1968
STEMMER, ROLAND C	1973
WHITE, BRUCE H.	1967

WOMN

AUTHOR	DATE
BAILEY, LARRY J.	1968
COOKE, ROBERT L.	1932
HARVEY, DAVID W	1971
HUBBARD, LOUIS H.	1930
KAUFMAN, CHARLES W.	1967
LINNICK, IDA	1949
LITTRELL, JOSEPH J.	1958
SCHRAMM, DWAYNE G.	1969

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AUTHOR	DATE
ANDERSON, HERBERT A.	1953
ANDERSON, KERMIT P.	1967
BALLARD, JOHN R.	1966
BECKHAM, JOE W.	1969
BJORNERUD, JAMES A.	1970
BORTZ, RICHARD F.	1967
BOX SR, MARSHALL R.	1967
BROOKS, WESTON T.	1964
CAPRON, JOHN H.	1955
CUNNINGHAM, BERYL M.	1952
ENTORF, JOHN F.	1967
FALLS, JOHN E.	1968
HANSEN, PHILLIP W.	1970
HAYNES, LUTHER J.	1956
HENAK, RICHARD M.	1971
HESS, HARRY L.	1969
HINCKLEY, EDWIN C.	1963
ISOM, VERNON H.	1970
JACOBSEN, JAMES H.	1964
JOHNSON, ROBERT I.	1958
KAISER, HAROLD F.	1968
KASSAY, JOHN A.	1970
KEENER, CLYDE	1959
KLEHM, WALTER A.	1937
LANDERS, MACK M	1972
LEMASTER, LELAN K.	1961
LENTO, ROBERT	1971
MILLER, THOMAS W.	1958
MUELLER, DENNIS L	1972
NEUBAUER, GERHARDT W	1956
OLSON, DAVID O.	1969
PIERSALL, ARNOLD C.	1964
PITTMAN, FRANK M.	1970
POLETTE, DOUGLAS L.	1972
QUIER, GEORGE T.	1969
QUINONES, LOUIS E	1973
STEGEMAN, ARTHUR L.	1957
WEALE, MARY J.	1968
WRIGHT, OSCAR W.	1954

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AUTHOR	DATE
GERBER, RUSSELL L.	1966

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AUTHOR	DATE
ACHILLES, CHARLES M.	1967
ASHCRAFT, NORMAN C.	1968
BALTIMORE, JIMMY R	1972
BARICH, DEWEY F.	1961
BURGETT, DONALD C.	1970
CANDOLI, I. C.	1967
DOUCETTE, RUSSELL J.	1972
ELIAS, JOHN E.	1970
FORBES, ROY H.	1970
FOWLER, HARMON R.	1970
FRYE, ROYE M.	1963
GORDON, KENNITH G.	1971
GORDON, LINDA	1971
GRAMBERG, MERLYN L.	1971
GRAY, KENNEY E.	1970
HELLAND, PHILLIP C.	1964
HOSTETLER, IVAN	1945
HUMBERT 3, JOHN J.	1967
JACOBY, WALTER	1961
JAESCHKE, DONALD P.	1971
JOHNSON, DUANE A.	1972
JOHNSON, FRANKLIN R.	1969
JOHNSON, RAYMOND C.	1971
KHOSHZAMIR, FIROUZ	1971
MEHAIL, SPIRO	1971
MELLINGER, BARRY L.	1972
MILLER, MARK E.	1967
MONTELLO, PAUL A.	1968
MORRISEY, THOMAS J.	1965
NEEDHAM, RAYMOND J.	1969
OGLE, LEWIS W.	1971
OLSEN, EUGENE A.	1968
PELLEGRIN JR, JOSEPH	1971
PERKINS, NEAL B.	1962
POTTER, DENIS A.	1973
RESNICK, HAROLD S.	1970
ROBERTSON, LYLE R.	1968
SCHAEFER, CARL J.	1959
SINE JR, JOHN M.	1972
SUNNARBORG, THOMAS R	1972
VAN DYKE, ARVID W.	1970
WEAGRAFF, PATRICK J.	1971
YOUNG, FRED O.	1971

ADMN - VOED

AUTHOR	DATE
ACHILLES, CHARLES M.	1967
ARCHER, ELTON W.	1971
ARNOLD, WALTER M.	1957
BALTIMORE, JIMMY R	1972
BASS, WILBUR A.	1967
BIKKIE, JAMES A.	1973
BISHOP, JAMES R.	1970
BLANTON, LLOYD H.	1970
BOWDOIN, PAUL	1966
BRIGGS, LLOYD D.	1971
CHUMBLEY, JOHN D	1972
COLGAN, FRANCIS E.	1967
DAVISON, HAROLD J.	1931
DENT JR, JACK E	1972
DOUCETTE, RUSSELL J.	1972
DRAKE, JAMES B.	1972
EICHER, ROBERT S.	1968
ELIAS, JOHN E.	1970
EVANS, WILSON A.	1954
FIELDING, MARVIN R.	1966
FOWLER, HARMON R.	1970
FRANK JR, HARRY E.	1968
GIBSON, CHARLES H.	1968
GRAY, KENNEY E.	1970
GREGG, MURRY C.	1972
HANSEN, EDITH H.	1972
HEATHMAN, JAMES E.	1972
HEGER, ROBERT J.	1968
HELLAND, PHILLIP C.	1964
HOUSE, ELAINE	1970
JANSEN, DUANE G.	1972
JOBE, MAX E	1972
KAISER, RONALD E.	1971
KAZANAS, HERCULES C.	1967
KHOSHZAMIR, FIROUZ	1971
KOHRAM, GEORGE E.	1952
KREPEL, WAYNE J.	1967
KU, GEORGE C	1972
LANG, EDWARD H.	1942
LESTER, SEELIG L.	1944
LONG, GILBERT A.	1970
MAGISOS, JOEL H.	1968
MARSHALL, CHARLES R.	1971
MARTIN, DARIEL D	1972
MC GIVNEY, JOSEPH H.	1967
MC NEIL, JACKSON M.	1968
MC PHERSON, DANIEL W	1971
MEISNER, ROBERT G.	1967
MEYER, JOHN D.	1970
MILAM, THOMAS R.	1968
MILLER, JACK D.	1971
MONEY, HOMER E.	1956
MONROE, ALLEN L.	1970
MONTELLO, PAUL A.	1968
OLSEN, EUGENE A.	1968
PARKS, DARRELL L.	1968
PARRY, ERNEST B.	1968
PELLEGRIN JR, JOSEPH	1971
PERKINS, NEAL B.	1962
PHILLIPS JR, MILTON	1967
PIERCE, WILLIAM F.	1967
PRICHARD, NEAL W.	1962
PUTMAN, CARL E.	1970
ROBERTS JR, LEWIS	1972
ROGAN, WILLIAM B	1973
ROSS, BENJAMIN P.	1944
ROTHENBERG, HARVEY D	1972
ROWNTREE, URWIN	1951
RUMPF, EDWIN L.	1954
SCHAEFER, CARL J.	1959
SHELTON, JOHN A.	1968
SOULE, DAVID H.	1966
TUXHORN, SCOTT E.	1967

ADMN - VUED

AUTHOR	DATE
WARD, DARRELL L.	1971
WASDYKE, RAYMOND G.	1971
WEAGRAFF, PATRICK J.	1971
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WOFFORD, THOMAS B.	1963
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DRAKE, JAMES B.	1972
FENDLASON, DONALD W.	1969
FRANK JR, HARRY E.	1968
HANSEN, EDITH H.	1972
HARRISON, DENIST D.	1972
HARTZON JR, WILEY G.	1972
HEATHMAN, JAMES E.	1972
HUBER, PAUL M.	1971
HUMBERT 3, JOHN J.	1967
KAISER, RONALD E.	1971
KISTLER, DALE E.	1971
KOVACH, ROBERT V	1972
KREPEL, WAYNE J.	1967
MAGISOS, JOEL H.	1968
MANNING, GEORGE E.	1971
MAW, JAMES L.	1971
MC KINNEY, FLOYD L.	1969
MC NEIL, JACKSON M.	1968
MELLINGER, BARRY L.	1972
MILAM, THOMAS R.	1968
MONROE, ALLEN L.	1970
MOSLEY, SAMUEL N.	1970
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PARKS, DARRELL L.	1968
PELLEGRIN JR, JOSEPH	1971
PHILLIPS JR, MILTON	1967
POTTER, DENIS A.	1973
PRICHARD, NEAL W.	1962
ROBERTS JR, LEWIS	1972
ROBERTS, EDWARD R.	1971
ROGAN, WILLIAM B	1973
ROTHENBERG, HARVEY D	1972
RUSSELL, GENE H.	1970
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FORREST JR, LEWIS C.	1970
HAGEN, DONALD L.	1972
LANGFORD JR, HARRY E	1973
LUDLOW, GERALD C	1973
MAW, JAMES L.	1971
MC LONEY WIRT L.	1965
NEASHAM, ERNEST R.	1968
ODBERT, JOHN T.	1973
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HEARN, ARTHUR R.	1948
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JONES, HOMER W	1973
LANDERS, MACK M	1972
LAWSON, TOM E	1973
MORRIS, ALLEN E.	1971
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CARTER, JOHN P.	1970
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GINTHER, RICHARD E.	1964
GLISMANN, LEONARD W.	1967
HAIGWOOD, THOMAS L.	1959
HALL, JAMES R.	1970
HAWSE, JOHN E.	1964
HILL, JOSHUA	1972
HUMBERT 3, JOHN J.	1967
INDRESANO, JOSEPH P	1973
JACKSON, PETER A.	1965
JAGEMAN, LARRY W.	1968
KUETEMEYER, VINCENT	1972
LEE, RAPHEL D C	1972
MC CLELLAN, LARRY D.	1971
MC LONEY WIRT L.	1965
MESSMAN, WARREN B.	1963
MILLER, LARRY R.	1971
MOSLEY, SAMUEL N.	1970
PARKER, DAVID W	1972
PERSHERN, FRANK R.	1967
RUSSELL, GENE H.	1970
STAMBOOLIAN JR, JOHN	1972
UNDERHILL, CHARLES M	1968
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WINDHAM, BILLY L.	1972

ATTD - I.E.

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FUZAK, JOHN A.	1948
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HUNTINGTON, HAROLD A	1940
JONES, GUY R.	1971
KARNES, M. RAY	1948
KENNEKE, LARRY J.	1968
LARSON, CURTIS G.	1971
LYBARGER, ALVIN E.	
MANNING, GEORGE E.	1971
MC CRORIE, THOMAS R.	1952
PFAHL, ALVIN K.	1970
SCHRAG, MARIE C.	1972
TIMPER, HANS E	1972
WALDORF, ROBERT J.	1971
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DE OLD, ALAN R.	1971
EASTON, CLIFFORD W.	1971
FAZZINI, PHILLIP A.	1970
GERNE JR, TIMOTHY A.	1967
GRANTHAM, LAWRENCE B	1972
HESS, HARRY L.	1969
JONES, HOMER W	1973
LAWSON, TOM E	1973
LINHARDT, RICHARD E.	1971
MC LONEY WIRT L.	1965
MORRIS, ALLEN E.	1971
MURPHY, JAMES O.	1972
REBHORN, ELDON A.	1972
STAMBOOLIAN JR, JOHN	1972

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AUTHOR	DATE
ANDERSON, LOWELL D.	1969
BEDNAR, ERNEST G.	1955
BURTON, JOHN R	1970
CORMACK, ROBERT B.	1970
CRAWDY, LARRY A.	1971
FENDLASON, DONALD W.	1969
FORREST JR, LEWIS C.	1970
GELINA, ROBERT J.	1972
GINTHER, RICHARD E.	1964
HAGEN, DONALD L.	1972
HARTZON JR, WILEY G.	1972
HEALAS, DONALD V.	1972
HILL, JOSHUA	1972
HUNTINGTON, HAROLD A	1940
JONES, GUY R.	1971
KENNEKE, LARRY J.	1968
KOVACH, ROBERT V	1972
KUETEMEYER, VINCENT	1972
LA BORDE, GERALD K	1973
LARSON, CURTIS G.	1971
LEE, RAPHEL D C	1972
LUDLOW, GERALD C	1973
MAW, JAMES L.	1971
MOSHIER, KENNETH D	1973
MOSLEY, SAMUEL N.	1970
OLSON, RICHARD R.	1971
OUTCALT, RICHARD M.	1971
PARKER, DAVID W	1972
PARKS, DARRELL L.	1968
PENDLETON, JOHN T	1973
PFAHL, ALVIN K.	1970
PHILLIPS, WILLIAM A	1973
ROBERTS JR, LEWIS	1972
RUSSELL, GENE H.	1970
SCHRAG, MARIE C.	1972
SPRECHER, ROBERT E.	1970
STEWART, HORACE L	1973
SULENTIC, MILO N	1973
SUNDIN, ROBERT L.	1971
TAYLOR, PAUL G	1971
TIMPER, HANS E	1972
WARGO, WILLIAM D.	1968
WIERSTEINER, SAMUEL	1970
WILLIS, GEORGE E.	1972
WINDHAM, BILLY L.	1972

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AUTHOR	DATE
GISRIEL, AUSTIN E.	1959
HILL, JOSHUA	1972
HOLM, MELVIN G.	1972
LYONS, RICHARD A.	1969
MURPHY, JAMES O.	1972
SULENTIC, MILO N	1973

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AUTHOR	DATE
ALSUP, REA T.	1967
CHEEK, GERALD D	1972
CLECKLER, JAMES D.	1969
CLIFTON, RONALD J.	1970
COHEN, CHESTER G.	1970
CONROY JR, WILLIAM G	1969
DIVINE, LLOYD E	1973
DOUCETTE, RUSSELL J.	1972
DRAKE, JAMES B.	1972
EVEN, MARY J.	1971
FIELDS, OWEN F	1972
FORREST JR, LEWIS C.	1970
FRANK JR, HARRY E.	1968
FULLER, MARY M.	1970
GELINA, ROBERT J.	1972
GILBREATH, TOMMY D.	1971
GILLILAND, HUGH R.	1967
HANSEN, EDITH H.	1972
HEALAS, DONALD V.	1972
HEATHMAN, JAMES E.	1972
HYDE, ELDON K.	1968
KAISER, RONALD E.	1971
KARNES, M. RAY	1948
KELLER, LOUISE J.	1969
KIEFER, CHARLES C	1972
KINGSLEY, LEONARD D.	1972
KOHL, ERNEST O.	1949
KREPEL, WAYNE J.	1967
LA BORDE, GERALD K	1973
LAHREN, JAMES A.	1970
LIGHT, KENNETH F.	1967
LUY, JACK A.	1964
LYNN, WILLIAM L.	1968
MAGISOS, JOEL H.	1968
MC CRORIE, THOMAS R.	1952
MC NEIL, JACKSON M.	1968
MILAM, THOMAS R.	1968
MILNOR, BRENT T.	1971
MONROE, ALLEN L.	1970
MORGAN, JIMMY B.	1969
MUND, RICHARD G.	1970
NAGLE, ROLAND F.	19
NEASHAM, ERNEST R.	1968
NORRIS, MARSENA M.	1968
PARKS, DARRELL L.	1968
PELLEGRIN JR, JOSEPH	1971
PENNER, WAYMAN R	1972
PHILLIPS JR, MILTON	1967
PHILLIPS, WILLIAM A	1973
POULIN, DONALD A	1972
PRICHARD, NEAL W.	1962
RICE, DICK C.	1966
ROBERTS JR, LEWIS	1972
ROBINSON, WILLIAM O.	1971
ROGAN, WILLIAM B	1973
ROTHENBERG, HARVEY D	1972
SCHRAG, MARIE C.	1972
SHEPARD, JON M.	1968
SHERCK, CHARLES P.	1969
SHIBLES, FOSTER M.	1971
SHULTZ, FRED A.	1971
SPRECHER, ROBERT E.	1970
STANGER, NORMAN R.	1967
SULENTIC, MILO N	1973
WERTHEIM, JUDITH B.	1971
WIERSTEINER, SAMUEL	1970
WILLIS, GEORGE E.	1972
WONG, LA VERNE B	1973
WOODS, WILLIAM H.	1971
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BHOJ - MNIP

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ALEXANDER, WILLIAM F	1969
KRUPPA, RICHARD A.	1970

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CREMER, KENNETH D.	1970
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BAILEY, DONALD A.	1970
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BROWN, ROBERT D.	1955
CONLEY, FRANKLIN	1968
CARDEN, BYRNES L.	1951
CELZAR, CHRISTIAN L.	1972
JACKEY, DAVID F.	1933
LAUDA, DONALD P.	1966
LUCY, JOHN H.	1971
ORR, RALPH O.	1970
PFAHL, ALVIN K.	1970
PHILLIPS, WILLIAM A	1973
PROCTOR, BERNARD S.	1950
RIVELL, AMOS C	1973
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BAILEY, DONALD A.	1970
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CONLEY, FRANKLIN	1968
EARHART, CECILIA R.	1946
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PHILLIPS, WILLIAM A	1973
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STOUGH, KENNETH F.	1968

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MINELLI, ERNEST L.	1957
OUTCALT, RICHARD M.	1971

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BUTTERY, WILLIAM A.	1971
LAUDA, DONALD P.	1966
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CPTR - GRAP

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AUTHOR	DATE
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HARDING, LARRY G.	1971
HILL, CLAIR S.	1971
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PHILLIPS, THOMAS G.	1971
STILLMAN, NEIL J	1972
ZIMMERS, EMORY W	1973

CRCN - DRAF

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BETTENCOURT, WILLIAM	1953
CASE, MERL E.	1971
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HUSUNG, WILLIAM T.	1970
NEE, JOHN G	1972
WALSTON, HARRY W.	1970

CRCN - ELEL

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FARR, WILBUR J.	1958
GOLDBERG, JOEL	1971
INGRAM, MAURICE D.	1971
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KLEIMAN, HERBERT S.	1966
LEVENSON, WILLIAM B.	1937
RIGBY, WILLIAM H	1972
SEIGLER, CLAUDE I.	1970
SHIGETOMI, SAMSON S.	1970
SKOUBY, ERIC W	1972
SORENSEN, RONALD L.	1964

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AUTHOR	DATE
BANZHAF, ROBERT A	1972
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MOREHEAD, JAMES C.	1971
MORRILL, DAVID	1970
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STRANDBERG, C. E.	1963

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GRAHAM, GREGORY S.	1971
GRIESENBROCK JR, HER	1955
THOMAS, HENRY L.	1971

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KILLAM, JACQUELINE R	1972
THORNTON, ROBERT W.	1971

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CROY, FLOYD E	1972
DAVIS, JIM L.	1966
GRANNIS, GARY E.	1970
WEATHERS, RICHARD D	1972

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AUTHOR	DATE
ANDERSON, HERBERT A.	1953
POLETTE, DOUGLAS L.	1972
QUINONES, LOUIS E	1973
NEALE, MARY J.	1968

CEMO - METH

AUTHOR	DATE
AMELON, DONALD J.	1969
BALL, CHARLES E.	1958
BENSON, M. J.	1967
CALEY, PAUL C.	1969
DUNFEE, EMERY S.	1964
JOHNSTON, JOHN L.	1956
JOLLY, FRANK H.	1970
LEMASTER, LELAN K.	1961
WORTHINGTON, ROBERT	1958
WRIGHT, WELCOME E.	1953

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JENSEN, THOMAS R.	1968
WOODEN, RALPH L.	1956

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CANDOLI, I. C.	1967
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AUTHOR	DATE
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FRAZIER, WILLIAM D.	1966

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BOWSER, JAMES A.	1960
CLARK, JAMES V.	1967
FALKENSTINE, JAMES C	1965
FRAZIER, WILLIAM D.	1966
FRYE, RONALD M.	1962
GADBOIS, ROBERT L.	1968
GILBREATH, TOMMY D.	1971
GREANEY, VINCENT M	1973
MOSS, JOHN F.	1962
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AUTHOR	DATE
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CASE, MERL E.	1971
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GIETL, RUDY E.	1971
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AUTHOR	DATE
ASHLEY, LAWRENCE F.	1936
BAIER, JON W	1973
BAKER, GEORGE L.	1970
BALDWIN, THOMAS R.	1971
BELL, CHARLES L.	1964
BRANTNER, SEYMOUR T.	1962
BRO, RONALD D.	1971
BRUCE, PHILLIP L.	1964
BURTON, JOHN R	1970
CAIN, CECIL R.	1958
CALLEN, LOUIS J.	1952
CARLSEN, CARVEY E.	1961
CHATFIELD, WILLIAM D	1955
COLEMAN, JAY M.	1971
COLEMAN, WAYNE D.	1967
DEVLIN, LEON G.	1971
DUNCAN, GLENN S.	1950
ECKER, LOUIS G.	1965
EDWARDS, LEONARD D.	1971
EPHRAIM, JOHN	1969
ERWIN, WILLIAM R.	1963
FAGAN, BERNARD T.	1970
FRANKSON, CARL E.	1948
GALLINGTON, RALPH O.	1947
GAVIN, GORDON O.	1968
GIFFORD, KENNETH K.	1970
GINTHER, RICHARD E.	1964
HANKAMMER, OTTO A.	1936
HARRIS, EDWIN J.	1971
HELTON, H. L.	1958
HILL, CHARLES R.	1950
HOLMAN, MARSHALL G	1972
HOOTS JR, WILLIAM R.	1966
HOOVER, ROGER L.	1967
HUNTINGTON, HAROLD A	1940
HYDER, CARROLL R.	1971
ILYAS, MUHAMMAD	1970
JACKEY, DAVID F.	1933
JACOBY, WALTER	1961
JOHNSON, RAYMOND C.	1971
KERWOOD, ROBERT V.	1967
KLABENES, ROBERT E.	1971
KOHLER, RODERICK G.	1952
KOO, PO-YEN	1968
LAPPIN, ALVIN R.	1958
LINDAU, ORA F.	1968
LOATS, HENRY A.	1950
MANSFIELD, ROBERT T.	1959
MARBURGER, EDWARD F.	1948
MILLER, JAMES A.	1971
MILLS, EARL S.	1971
MITCHELL, JOHN	1954
MORELAND JR, HENRY C	1970
MOSHIER, KENNETH D	1973
NAIR, RALPH K.	1950
NIELSEN, ERWIN E.	1969
PAWELEK, STANLEY J.	1941
POLESZAK, LEONARD J.	1969
PROCTOR, BERNARD S.	1950
REESE, ROBERT M.	1954
REID, DEMPSEY E.	1956
ROEDER, JOHN A.	1972
RUDISILL, ALVIN E.	1969
SARGENT, WILLIAM T.	1956
SEXTON, WILLIAM E.	1965
SIMONS, JEROLD J.	1967
SINGLETARY, THOMAS A	1968
STEPHENSON, LESLIE E	1958
STONER, WILLIAM D.	1940
SUNDIN, ROBERT L.	1971
TOWERS, EDWARD R.	1956
WALLIS, DONALD E.	1965
WEINER, DONALD A.	1971

EVPR — TEED

AUTHOR	DATE
WILBER, GEORGE O.	1941
WILLIAMS, WILLIAM A.	1959
WINTERS, KENNETH W.	1970
WOMMACK, CHARLES H.	1967

EVFA — TEEF

AUTHOR	DATE
CAIN, JOHN N.	1970
EHRENBORG, JOHN D.	1963
GIANINI, PAUL C.	1968
HAMMACK, CHARLES R.	1967
LOEPP, FRANZIE L.	1970
OLIVER, WILMOT F.	1967
WILLIAMS III, WALTER	1963

EVPN — ATTD

AUTHOR	DATE
BALL, JOHN E.	1971
DOELLINGER, KEITH E.	1971
ELLIOTT, BURTON L.	1971
EPSTEIN, JACK H.	1971
GALLOWAY, JOEL D.	1972
GISRIEL, AUSTIN E.	1959
HANSEN, EDITH H.	1972
HEALAS, DONALD V.	1972
HOERNER, HARRY J.	1969
KAISER, RONALD E.	1971
KREPEL, WAYNE J.	1967
LA BORDE, GERALD K	1973
LE BLANC, DARRELL R.	1971
LYBARGER, ALVIN E.	
MILNOR, BRENT T.	1971
MONROE, ALLEN L.	1970
MUND, RICHARD G.	1970
MURRY, CLAIR A	1972
NICHOLS JR, GEORGE V	1971
REBHORN, ELDON A.	1972
ROBERTS, EDWARD R.	1971
ROGAN, WILLIAM B	1973
WINCHAM, BILLY L.	1972
WOODS, WILLIAM H.	1971

EVPR — GRAD

AUTHOR	DATE
BALDWIN, THOMAS R.	1971
DEVLIN, LEON G.	1971
MORELAND JR, HENRY C	1970
PERSHING, REX W.	1970

EQIP — FACP

AUTHOR	DATE
HICKS, CAROL E	1973
KLEHM, WALTER A.	1937
MC GAW, SIDNEY E.	1952
ROSS, RAYMOND J.	1966
WINEGAR, GARY H.	1969

EVST — ELEL

AUTHOR	DATE
FOLEY JR, JOHN P.	1968
GARNER, CAREY C.	1969
LYONS, RICHARD A.	1969
SMITH, BRANDON B.	1968

EXCD — METH

AUTHOR	DATE
BAUGRUD, KIM J.	1968
BENDER, MICHAEL	1971
BLAND, LARSON M.	1972
JACKMAN, DUANE A.	1961
NOTHDURFT, MARIE E	1972
OLSON, DAVID O.	1969

EXPR — GUID

AUTHOR	DATE
GOFF, WILLIAM H.	1967
WILKINSON, WILLIAM E	1972

EXPR — MNIP

AUTHOR	DATE
ALEXANDER, WILLIAM F	1969
ARVEY, RICHARD D.	1970
AUER, HERBERT J.	1971
BAKER, NORMAN A.	1971
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
BOUTWELL JR, COLEN J	1971
BROWN, JAMES T	1973
CALDER JR, CLARENCE	1964
CHASTAIN, GARY K.	1972
COOVER, SHRIVER L.	1941
GEDEON, DAVID V.	1971
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HENAK, RICHARD M.	1971
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
HURLEY, CARL E.	1971
JANECZKO, ROBERT J.	1971
JENKINS, JOHN D.	1969
JOLLY, FRANK H.	1970
KIEFT, LEWIS D.	1970
KRUPPA, RICHARD A.	1970
LARUE, JAMES P.	1968
MARTIN, GORDON E	1972
MARTINEZ, PETE	1970
MEERS, GARY D	1972
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NORTON, ROBERT E.	1967
PRITCHARD, MIRIAM C.	1937
RAPHAEL, MICHAEL A.	1971
REBHORN, ELDON A.	1972
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
SUESS, ALAN R.	1962
WAISNER, GARY L.	1970
WEFFENSTETTE, WALTER	1965
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WORTHINGTON, ROBERT	1958

EXPR — PROB

AUTHOR	DATE
BABCOCK, JAMES G.	1969
BRENNER, CHARLES J.	1968
CORNWELL, RAYMOND L.	1961
EASTON, CLIFFORD W.	1971
HOLT, IVIN L.	1972
LINDEMEYER, RAY S.	1954
ROWLETT, JOHN D.	1960
SAGE, JAMES E.	1971
SCHUMM, FRED C	1972

EXPR — SKIL

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENDER, MICHAEL	1971
BIEKERT, RUSSELL G.	1971
BLANKENBAKER, EDWIN	1970
BROWN, JAMES T	1973
CALDER JR, CLARENCE	1964
CHASTAIN, GARY K.	1972
EASTON, CLIFFORD W.	1971
GEDEON, DAVID V.	1971
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HARRELL, WILLIAM R	1972
HENAK, RICHARD M.	1971
HEYEL, CLARENCE L.	1967
HOFER, ARMAND G.	1963
HUDSON, DONALD W.	1972
HURLEY, CARL E.	1971
JANECZKO, ROBERT J.	1971
JOLLY, FRANK H.	1970
KIEFT, LEWIS D.	1970
LARUE, JAMES P.	1968
LINDAHL, LAWRENCE G.	1944
MANCHAK, PAUL J.	1965
MARTIN, GORDON E	1972
MARTINEZ, PETE	1970
MEERS, GARY D	1972
NANNAY, ROBERT W.	1970
NELSON, ORVILLE W.	1967
NORTON, ROBERT E.	1967
OLSON, DAVID O.	1969
REBHORN, ELDON A.	1972
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SCHACHT, ROBERT C.	1971
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
SUESS, ALAN R.	1962
WAISNER, GARY L.	1970
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WOOD, MILTON E	1973
WORTHINGTON, ROBERT	1958

GRAD — I.A.

AUTHOR	DATE
FEIRER, JOHN L.	1946
HENRY, GEORGE F.	1954
MORELAND JR, HENRY C	1970
PERSHING, REX W.	1970
WIGEN, RAY A.	1957

HIED - I.A.

AUTHOR	DATE
ALLEN, WILLARD A.	1963
BAAB, CLARENCE T.	1950
BAKAMIS, WILLIAM A.	1951
BALL, JOHN E.	1971
BATESON, WILLARD M.	1954
BENDIX, JOHN L.	1965
BOYDEN, LLOYD R.	1972
CARLSEN, CARVEY E.	1961
COLEMAN, JAY M.	1971
CRIST, LEROY	1961
CUMMINS, CARL C.	1957
DARDEN, BYRNES L.	1951
DECKER, GEORGE C.	1943
DIRKSEN, DENNIS A.	1969
EDWARDS, LEONARD D.	1971
FEIRER, JOHN L.	1946
GAVIN, GORDON O.	1968
GHEEN, W. LLOYD	1970
GIFFORD, KENNETH K.	1970
GINTHER, RICHARD E.	1964
GRAHAM, GREGORY S.	1971
HANKAMMER, OTTO A.	1936
HAWKINS, LESLIE V.	1953
HENRY, GEORGE F.	1954
HISER, PAUL T.	1958
JACKSON, PETER A.	1965
KIRKWOOD, JAMES J.	1970
KIST, KEVIN W.	1970
KROH, DAMON K	1957
KURTH, EDWIN L.	1955
LARSON, IRVING W.	1969
MALEY, DONALD	1949
MESSMAN, WARREN B.	1963
MORELAND JR, HENRY C	1970
NELSON, REX A.	1963
O DELL, ROBERT D.	1963
O NEILL, JOHN N.	1971
PERSHING, REX W.	1970
PIERSALL, ARNOLD C.	1964
REAMS, JAKE W.	1963
REID, DEMPSEY E.	1956
ROBERTS, NORMAN N.	1967
SILVIUS, HAROLD G.	1946
STONER, WILLIAM D.	1940
THOMPSON, BRUCE L.	1971
TORRES, LEONARD	1963
TUCKER, CASEY A.	1965
VACEK, WILLIAM L.	1962
VAUGHN, MAURICE S.	1967
WARGO, WILLIAM D.	1968
WEBER, EARL M.	1961
WIED, ALEXANDER F.	1972
WIGEN, RAY A.	1957
ZOPPETTI, MATTHEW	1970

HIED - MNIP

AUTHOR	DATE
ARVEY, RICHARD D.	1970
AUER, HERBERT J.	1971
BROWN, JAMES T	1973
CALDER JR, CLARENCE	1964
GIMBEL, ARMIN F.	1953
MC EOWEN, ROBERT H.	1967

HIED - SKIL

AUTHOR	DATE
BROWN, JAMES T	1973
CALDER JR, CLARENCE	1964
GIMBEL, ARMIN F.	1953

HIED - WOMN

AUTHOR	DATE
HUBBARD, LOUIS H.	1930
LINNICK, IDA	1949

ININ - MNIP

AUTHOR	DATE
FLUG, EUGENE R.	1967
HOFER, ARMAND G.	1963
KASSAY, JOHN A.	1970
MC EOWEN, ROBERT H.	1967
NORTON, ROBERT E.	1967
WOMACK, WILLIAM M.	1971

INPG - CNST

AUTHOR	DATE
BERGSTROM, PHILIP G.	1970
HAYNES, LUTHER J.	1956
KUWIK, PAUL D.	1970
PETER, RICHARD F.	1970
WEST, WILLIAM E.	1969
YOUNG, DARIUS R.	1968

INSD - MNIP

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENSEN, JAMES M.	1967
GRUNWALD, WALTER	1968
HERR, JAMES F.	1970
HURLEY, CARL E.	1971
MOORE, BILLY M	1973

INSD - SKIL

AUTHOR	DATE
BAKER, NORMAN A.	1971
GRUNWALD, WALTER	1968
HURLEY, CARL E.	1971
LICHTBLAU, LEONARD R	1958
MOORE, BILLY M	1973
NISH, DALE L.	1967

INSM - MNIP

AUTHOR	DATE
HAILES, CHARLES W.	1971
RILEY, JOHN N.	1972

INSM - SKIL

AUTHOR	DATE
HAILES, CHARLES W.	1971
LICHTBLAU, LEONARD R	1958
RILEY, JOHN N.	1972

INSR - IND.

AUTHOR	DATE
ADAMS, AARON F.	1961
COCHRAN, GEORGE C.	1967
CUTLER, THEODORE H.	1948
DIRKSEN, RALPH E.	1969
ESTLE, EDWIN F.	1966
FURIA, JOHN J.	1930
GEHRING, GLEN S.	1969
LINE, JOHN D.	1971
MACALUSO, MICHAEL D	1972
ROSENQUIST, BARBARA	1971
SCHMITT, VICTOR A.	1953
THORNE III, EDWARD H	1972
WHEELER, EDWARD A.	1965

JUCC - WCMN

AUTHOR	DATE
SCHRAMM, DWAYNE G.	1969

MAIN - EQIP

AUTHOR	DATE
CUNNINGHAM, BERYL M.	1952
FROESE, RICHARD A	1972
MC ARTHUR, ROSS J.	1955

MEDA - MNIP

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENSEN, JAMES M.	1967
BOUTWELL JR, COLEN J	1971
CHASTAIN, GARY K.	1972
FLUG, EUGENE R.	1967
HERR, JAMES F.	1970
HURLEY, CARL E.	1971
JENKINS, JOHN D.	1969
MEERS, GARY D	1972
RAPHAEL, MICHAEL A.	1971
RILEY, JOHN N.	1972
SNYDER, VANCE B.	1960

MECA - SKIL

AUTHOR	DATE
BAKER, NORMAN A.	1971
BENDER, MICHAEL	1971
CHASTAIN, GARY K.	1972
FLUG, EUGENE R.	1967
HURLEY, CARL E.	1971
MEERS, GARY D	1972
RILEY, JOHN N.	1972
SNYDER, VANCE B.	1960
WOOD, MILTON E	1973

METH - TEED

AUTHOR	DATE
CALDER JR, CLARENCE	1964
CROWDER, GENE A.	1968
DAWSON, KENNETH E.	1965
DITLOW, GEORGE H.	1956
DUNFEE, EMERY S.	1964
EDSALL, ALAN R	1972
FRYE, BILL J.	1971
GHEEN, W. LLOYD	1970
GHEEN, WILLIAM L.	1970
HARDER, JACOB C.	1970
HOLT, IVIN L.	1972
ISRAEL, EVERETT N	1972
JACKMAN, DUANE A.	1961
JACOBY, WALTER	1961
JELDEN, DAVID L.	1960
KRUGER, JOHN M.	1971
KURTH, EDWIN L.	1955
LAPPIN, ALVIN R.	1958
LEASE, ALFRED A.	1964
LEWCHUK, LESLIE L	1972
LOW, FRED G.	1963
MILLS, EARL S.	1971
MITCHELL, JOHN	1954
NOVOSAD, JOHN P.	1971
O HARA, JAMES S	1972
RAY, J. EDGAR	1944
SEXTON, WILLIAM E.	1965
THATCHER, GLENN M.	1970

PHIL - ADMN

AUTHOR	DATE
BACKUS, KERBY D.	1968
BAIER, JON W	1973
BAILY, ATHOL R.	1949
BAYNE, GEORGE K.	1972
BIKKIE, JAMES A.	1973
DAVISON, HAROLD J.	1931
FENDLASON, DONALD W.	1969
HAMMOND, ROBERT G.	1956
HANSEN, EDITH H.	1972
HARTZON JR, WILEY G	1972
JACOBY, WALTER	1961
KREPEL, WAYNE J.	1967
MAGISOS, JOEL H.	1968
MALIK, JOSEPH A.	1968
MASON, WILLIAM H.	1970
MC GIVNEY, JOSEPH H.	1967
MC KINNEY, FLOYD L.	1969
MC NEIL, JACKSON M.	1968
PRICHARD, NEAL W.	1962
ROBERTS JR, LEWIS	1972
ROGAN, WILLIAM B	1973
SHELTON, JOHN A.	1968
THORP, JOHN H.	1945
WEAGRAFF, PATRICK J.	1971
WHITE, CHARLIE H	1972
YOUNG, FRED O.	1971
ZULLINGER, JOHN	1966

PHIL - COUN

AUTHOR	DATE
CLEVELAND, JOHN M.	1961
HYDE, ELDON K.	1968
LOOSLE, DARRELL K.	1967
OSORNO, WENDELL A	1972

MNIP - METH

AUTHOR	DATE
ALEXANDER, WILLIAM F	1969
ALLEN, JOHN C.	1969
AUER, HERBERT J.	1971
BAKER, NORMAN A.	1971
BENSEN, JAMES M.	1967
BENSON, M. J.	1967
BIEKERT, RUSSELL G.	1971
BOUTWELL JR, COLEN J	1971
BROWN, JAMES T	1973
CALDER JR, CLARENCE	1964
CHASTAIN, GARY K.	1972
CUSHING, NELSON N.	1971
DOTY, CHARLES R.	1968
FLUG, EUGENE R.	1967
GEDEON, DAVID V.	1971
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HANSON, ROBERT R.	1970
HERR, JAMES F.	1970
HOFER, ARMAND G.	1963
HOFFMAN, LARRY D.	1971
HUDSON, DONALD W.	1972
HULL, THOMAS F.	1964
HURLEY, CARL E.	1971
JOLLY, FRANK H.	1970
KRUGER, JOHN M.	1971
LARUE, JAMES P.	1968
MARTIN, GORDON E	1972
MARTINEZ, PETE	1970
MC EOWEN, ROBERT H.	1967
MEERS, GARY D	1972
MEYER, JOHN M.	1969
NANNAY, ROBERT W.	1970
NORTON, ROBERT E.	1967
ORR, WILLIAM H.	1970
RAPHAEL, MICHAEL A.	1971
REBHORN, ELDON A.	1972
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
SUESS, ALAN R.	1962
WAISNER, GARY L.	1970
WEFFENSTETTE, WALTER	1965
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WORTHINGTON, ROBERT	1958

PHIL - HIED

AUTHOR	DATE
CLABAUGH, RICHARD D.	1971
CLECKLER, JAMES D.	1969
FENDLASON, DONALD W.	1969
HAMMER, GARLAND G.	1951
HYDE, ELDON K.	1968
KIEFER, CHARLES C	1972
LANGFORD JR, HARRY E	1973
MALIK, JOSEPH A.	1968
SHERMAN, DOUGLAS R.	1956
STEGMAN, GEORGE K.	1962

PHIL - I.A.

AUTHOR	DATE
BACKUS, KERBY D.	1968
BAIER, JON W	1973
BAIRD, RONALD J.	1960
BIEDLER, JOHN S.	1958
CALLAWAY, ROLAND L.	1953
CARTER, JOHN P.	1970
FALES, ROY G.	1948
HALL, JAMES R.	1970
HAWSE, JOHN E.	1964
HORNBLAKE, R. LEE	1939
HUXOL, ROBERT L.	1954
KACHEL, STANLEY	1967
LEE, RAPHEL D C	1972
MASON, WILLIAM H.	1970
MASSENGILL, JOHN P.	1952
MC CLELLAN, LARRY D.	1971
MC PHERSON, WILLIAM	1972
MEYER, HARVEY K.	1951
NIELSEN, ARNOLD M.	1970
PARKER, DAVID W	1972
PATE JR, DOVE H.	1970
SHUNN, DONALD W	1972
SIMMONS, CARRELL D	1958
SVENDSEN, ETHAN A.	1961
TALKINGTON, JOE E.	1962
THOMAS, CHARLES L.	1964
THOMAS, JOSEPH K.	1957
THORP, JOHN H.	1945
TRYON, VERNON A	1972
TSUJI, THOMAS T.	1967
WHITESEL, JOHN A.	1940
WOCKENFUSS, WILLIAM	1960
WOODY JR, EARL T.	1963

PHIL - I.E.

AUTHOR	DATE
ANDERSON, LOWELL D.	1969
BAILY, ATHOL R.	1949
CUNICO, GERALD E	1973
DAVISON, HAROLD J.	1931
HAMMER, GARLAND G.	1951
HAMMOND, ROBERT G.	1956
HERSCHBACH, DENNIS R	1973
KARR, DONALD L.	1969
MASSENGILL, JOHN P.	1952
MC CRORIE, THOMAS R.	1952
MC KEE, RONALD R.	1971
MOELLER, CARL A.	1961
MALSTROM, STIG E.	1969
ROBINSON, WALTER J.	1950
TIMPER, HANS E	1972
ZULLINGER, JOHN	1966

PHIL - T.I.

AUTHOR	DATE
HAMMER, GARLAND G.	1951
KARR, DONALD L.	1969
SEARS JR, WILLIAM P.	1930

PHIL - TCED

AUTHOR	DATE
DAVIS, WARREN C.	1936
HANSEN, EDITH H.	1972
HIRSCHI, HARVEY C.	1969
HYDE, ELDON K.	1968
PENNER, WAYMAN R	1972
PRICHARD, NEAL W.	1962
ROBERTS JR, LEWIS	1972
SLATTERY, RAYMOND A.	1969

PHIL - VCED

AUTHOR	DATE
BIKKIE, JAMES A.	1973
CARR, EVA R.	1970
CLECKLER, JAMES D.	1969
DASGUPTA, DEBENDRA C	1932
DAVIS, WARREN C.	1936
DAVISON, HAROLD J.	1931
DYKEHOUSE, JAY	1950
HANSEN, EDITH H.	1972
HARRISON JR, RUSSELL	1971
HIRSCHI, HARVEY C.	1969
HYDE, ELDON K.	1968
KELLER, LOUISE J.	1969
KIEFER, CHARLES C	1972
KINGSLEY, LEONARD C.	1972
KREPEL, WAYNE J.	1967
LAHREN, JAMES A.	1970
LOOSLE, DARRELL K.	1967
MAGISOS, JOEL H.	1968
MC CRORIE, THOMAS R.	1952
MC GIVNEY, JOSEPH H.	1967
MC NEIL, JACKSON M.	1968
MEDEIROS, EDWARD J.	1970
MOELLER, CARL A.	1961
MORGAN, JIMMY B.	1969
NEASHAM, ERNEST R.	1968
OSORNO, WENDELL A	1972
PENNER, WAYMAN R	1972
PHILLIPS, WILLIAM A	1973
PRICHARD, NEAL W.	1962
ROBERTS JR, LEWIS	1972
ROGAN, WILLIAM B	1973
SCHREIBER, ERNEST	1967
SEARS JR, WILLIAM P.	1930
SHELTON, JOHN A.	1968
SHEPARD, JON M.	1968
SHERMAN, DOUGLAS R.	1956
SHULTZ, FRED A.	1971
SLATTERY, RAYMOND A.	1969
SOLA, PETER A	1972
SPRECHER, ROBERT E.	1970
WEAGRAFF, PATRICK J.	1971
WILLIS, GEORGE E.	1972
YOUNG, FRED D.	1971

PROG - EVPR

AUTHOR	DATE
CHRISMAN, JOSEPH P.	1970
DANNENBERG, RAYMOND	1965
HOCH, EMIL H.	1969
SHULL, HOWARD I.	1969
STEPHENS, KENT G	1972

PRED - PRTR

AUTHOR	DATE
ATHANASIOU, ROBERT B	1969
AUCKER, JOHN R.	1970
BEACH, CHARLES K.	1941
BEHM, HARLEY D.	1967
DITTENHAFER, CLARENC	1972
FLEMING, JOSEPH W.	1937
GIACHINO, JOSEPH W.	1949
JELDEN, DAVID L.	1971
KAPES, JEROME T.	1971
KOUTNIK, PAUL G.	1968
MILLER, AARON J.	1966
PITTMAN, FRANK M.	1970
SANDMAN, CHARLES W.	1969
STONE, THOMAS C.	1969
STOUGHTON, ROBERT W.	195[illegible]
SULLIVAN, THOMAS W.	1967
VACEK, WILLIAM L.	1962
ZIMMER, THEODORE A.	1969

PRED - VOGI

AUTHOR	DATE
ANDERSON, EDWARD T.	1970
BEACH, CHARLES K.	1941
BEHM, HARLEY D.	1967
BORTZ, WALTER R.	1971
BOYDEN, LLOYD R.	1972
CHILSON, JOHN S.	1969
COHEN, JERRY M.	1969
COX, STEVEN G.	1968
DITTENHAFER, CLARENC	1972
ELKINS, RICHARD L	1972
ELLIOTT, EARL S.	1967
EVANCHO, MICHAEL	1947
FAUROT, LYLE M	1973
FLEMING, JOSEPH W.	1937
FRYKLUND, VERNE C.	1933
GRIFFIN, JAMES F.	1970
HARRIS, VIRGINIA J.	1961
HAUGO, RICHARD R.	1969
HYDE, THOMAS E	1973
JENKINS, FARRELL T.	1969
KAPES, JEROME T.	1971
KRANTZ, MATTHEW B.	1970
KRUBECK, FLOYD E.	1954
KUNTZ, ELMER L.	1968
LARSON, RAYMOND H.	1951
MICHIE, JACK	1968
MILLER, AARON J.	1966
MILLER, CLARENCE M.	1968
MOORE, LELAND B.	1970
NESWICK, LAWRENCE G.	1971
QUICK, OTHO J.	1954
RICHARDSON, ROBERT B	1967
SANDMAN, CHARLES W.	1969
SCHULTZ, IRWIN J.	1949
THORPE, CLAIBURNE B.	1968
WOOLDRIDGE, ROBERT E	1961
YOUNG, ROBERT W.	1966

PROB - ININ

AUTHOR	DATE
FINCH, CURTIS R.	1969

PRPL - ADMN

AUTHOR	DATE
ACHILLES, CHARLES M.	1967
ASHCRAFT, NORMAN C.	1968
BALTIMORE, JIMMY R	1972
BARICH, DEWEY F.	1961
BURGETT, DONALD C.	1970
CANDOLI, I. C.	1967
DOUCETTE, RUSSELL J.	1972
ELIAS, JOHN E.	1970
FORBES, ROY H.	1970
FOWLER, HARMON R.	1970
FRYE, ROYE M.	1963
GORDON, KENNITH G.	1971
GORDON, LINDA	1971
GRAMBERG, MERLYN L.	1971
GRAY, KENNEY E.	1970
HELLAND, PHILLIP C.	1964
HOSTETLER, IVAN	1945
HUMBERT 3, JOHN J.	1967
JACOBY, WALTER	1961
JAESCHKE, DONALD P.	1971
JOHNSON, DUANE A.	1972
JOHNSON, FRANKLIN R.	1969
JOHNSON, RAYMOND C.	1971
KHOSHZAMIR, FIROUZ	1971
MEHAIL, SPIRO	1971
MELLINGER, BARRY L.	1972
MILLER, MARK E.	1967
MONTELLO, PAUL A.	1968
MORRISEY, THOMAS J.	1965
NEEDHAM, RAYMOND J.	1969
OGLE, LEWIS W.	1971
OLSEN, EUGENE A.	1968
PELLEGRIN JR, JOSEPH	1971
PERKINS, NEAL B.	1962
POTTER, DENIS A.	1973
RESNICK, HAROLD S.	1970
ROBERTSON, LYLE R.	1968
SCHAEFER, CARL J.	1959
SINE JR, JOHN M.	1972
SUNNARBORG, THOMAS R	1972
VAN DYKE, ARVID W.	1970
WEAGRAFF, PATRICK J.	1971
YOUNG, FRED O.	1971

PRPL - COFS

AUTHOR	DATE
AXELROD, AARON	1951
DAVIS, WARREN C.	1936
ILLINIK, ROBERT L.	1971
KELLY, MICHAEL V.	1968
MUNGER, PAUL R.	1972
ZABCIK, CALVIN L.	1969

READ - METH

AUTHOR	DATE
FROELICH, DONALD M.	1970
HANSBURG, HENRY	1935
HOUSEHOLDER, DANIEL	1963
LEASE, ALFRED A.	1964
RICHARDS, KENVYN B.	1970
WOLFE, JAMES M.	1970

PRPL - TEED

AUTHOR	DATE
BAAB, CLARENCE T.	1950
BALTIMORE, JIMMY R	1972
BEKTON, WILLIAM E.	1965
CHARLESWORTH, KENNET	1968
DAVIS, JIM L.	1966
DRAZEK, STANLEY J.	1950
EPHRAIM, JOHN	1969
ERWIN, WILLIAM R.	1963
FRYE, BILL J.	1971
GILBERT, HAROLD G.	1955
GUENTZLER, WILLIAM D	1973
JACOBY, WALTER	1961
JOHNSON, RAYMOND C.	1971
KROH, DAMON K	1957
MANESS, MARION T.	1969
MILLER, JAMES A.	1971
MUELLER, DENNIS L	1972
NOVOSAD, JOHN P.	1971
PARKS, GERALD A.	1969
PAYNE, AM V.	1965
ROBERTS, NORMAN N.	1967
RYAN, CHESTER M.	1963
SCHAEFER, CARL J.	1959
SCHMITT, CARLOS R.	1971
SECHREST, CHARLES H.	1953
TIMPER, HANS E	1972
VAN BENSCHOTEN, RAYM	1971
WILBER, GEORGE O.	1941
WILSON, WADE	1954

RECT - JUCO

AUTHOR	DATE
MINKEVICH, GEORGE	1972
NEUFELD, JACOB A.	1968
O DELL, ROBERT D.	1963
WIERSTEINER, SAMUEL	1970

RECT - TEED

AUTHOR	DATE
CONLEY, FRANKLIN	1968
CRIST, LEROY	1961
EVERSOLL, ROBERT I.	1971
FOLEY JR, DENIS J.	1967
GERBRACHT, CARLTON J	1949
LARSON, IRVING W.	1969
MALLARY, BENJAMIN E.	1932
MELLMAN, ROBERT A.	1957
MESSERSCHMIDT, DALE	1967
RESSLER, RALPH	1966
RUTHERFORD, WILLIAM	1962
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SENTENEY, GEORGE W.	1955
SIRG, EINAR E.	1949
SOURS, CHARLES F.	1969
VAN BENSCHOTEN, RAYM	1971
WIERSTEINER, SAMUEL	1970
WILSON, ROGER J.	1970

SELC - TEED

AUTHOR	DATE
BENSON, WILLARD A.	1959
CUMMINS, CARL C.	1957
FOLEY JR, DENIS J.	1967
HENRY, GEORGE F.	1954
JOHNSON, RUFUS G.	1949
MALLARY, BENJAMIN E.	1932
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SIRO, EINAR E.	1949
SULENTIC, MILO N	1973

SKIL - METH

AUTHOR	DATE
ALLEN, JOHN C.	1969
BAKER, NORMAN A.	1971
BENDER, MICHAEL	1971
BIEKERT, RUSSELL G.	1971
BROWN, JAMES T	1973
CALDER JR, CLARENCE	1964
CHASTAIN, GARY K.	1972
CUSHING, NELSON N.	1971
DOTY, CHARLES R.	1968
EASTON, CLIFFORD W.	1971
ESTLE, EDWIN F.	1966
FLUG, EUGENE R.	1967
GEDEON, DAVID V.	1971
GRUNWALD, WALTER	1968
GUNTHER, THERESA C.	1931
HACKLER, CLYDE M.	1971
HAILES, CHARLES W.	1971
HANSON, ROBERT R.	1970
HARRELL, WILLIAM R	1972
HEYEL, CLARENCE L.	1967
HOFER, ARMAND G.	1963
HUDSON, DONALD W.	1972
HURLEY, CARL E.	1971
JOHNSON, RAY A.	1971
JOLLY, FRANK H.	1970
LARUE, JAMES P.	1968
LICHTBLAU, LEONARD R	1958
LINDAHL, LAWRENCE G.	1944
LOW, FRED G.	1963
MANCHAK, PAUL J.	1965
MARTIN, GORDON E	1972
MARTINEZ, PETE	1970
MEERS, GARY D	1972
MEYER, JOHN M.	1969
NANNAY, ROBERT W.	1970
NISH, DALE L.	1967
NORTON, ROBERT E.	1967
OLSON, DAVID O.	1969
ORR, WILLIAM H.	1970
REBHORN, ELDON A.	1972
RILEY, JOHN N.	1972
ROWLETT, JOHN D.	1960
SCHACHT, ROBERT C.	1971
SNYDER, VANCE B.	1960
SOMMER, SEYMOUR A.	1971
ST JOHN, DAVID R.	1971
STEMMER, ROLAND C	1973
SUESS, ALAN R.	1962
WAISNER, GARY L.	1970
WHITE, CONRAD L.	1970
WILLEMS, ALVIN E.	1970
WOOD, MILTON E	1973
WORTHINGTON, ROBERT	1958

SUPR - I.A.

AUTHOR	DATE
BAKAMIS, WILLIAM A.	1951
CHRISTOFFEL, FREDERI	1960
GILBERT, HAROLD G.	1955
JOHNSON, VERNER B.	1966
MC ROBBIE, J. M.	1963
MICHEELS, WILLIAM J.	1941
SARGENT, WILLIAM T.	1956
SCHANK, KENNETH L.	1965
SCHORLING, HORACE O.	1950
SECHREST, CHARLES H.	1953
SECKENDORF, ROBERT S	1960
SMITH, IRVING G.	1969
STEEB, RALPH V.	1959
STEVENSON, JAMES E.	1953
TAXIS, DAVID O.	1962

SUPR - I.E.

AUTHOR	DATE
BOWDOIN, PAUL	1966
BRANDON, GEORGE L.	1952
CRESSMAN, PAUL L.	1934
LESTER, SEELIG L.	1944
MANNING, GEORGE E.	1971
PETERS, DONALD F.	1959
TOBIN, GERALD W.	1972

SUPR - IND.

AUTHOR	DATE
CRUDDEN, PAUL B.	1944
EDWARDS, JOHN T.	1970
LINE, JOHN D.	1971
LOVELESS JR, SIDNEY	1969
LUFF, ANDREW C.	1955
MANSFIELD, WESLEY B.	1970
PARNES, SIDNEY J.	1954
RIETH, CLAUDE E.	1966
SCHOEPPLER, JACOB	1958
STEWART, WILLIAM J.	1968

TEED - GRAD

AUTHOR	DATE
ADELMAN, FRANK W.	1972
BALDWIN, THOMAS R.	1971
BETTIS, GLENN E.	1973
DEVLIN, LEON G.	1971
FEIRER, JOHN L.	1946
GIMBEL, ARMIN F.	1953
HENRY, GEORGE F.	1954
MORELAND JR, HENRY C	1970

TEED - TEST

AUTHOR	DATE
GALLINGTON, RALPH O.	1947
HILL, JOSHUA	1972
SULENTIC, MILO N	1973

TEED - RECT

AUTHOR	DATE
CONLEY, FRANKLIN	1968
CRIST, LEROY	1961
EVERSOLL, ROBERT I.	1971
FOLEY JR, DENIS J.	1967
GERBRACHT, CARLTON J	1949
LARSON, IRVING W.	1969
MALLARY, BENJAMIN E.	1932
MELLMAN, ROBERT A.	1957
MESSERSCHMIDT, DALE	1967
RESSLER, RALPH	1966
RUTHERFORD, WILLIAM	1962
SCHERER, HARLAN L.	1960
SCHILL, WILLIAM J.	1961
SENTENEY, GEORGE W.	1955
SIRO, EINAR E.	1949
SOURS, CHARLES F.	1969
VAN BENSCHOTEN, RAYM	1971
WIERSTEINER, SAMUEL	1970
WILSON, ROGER J.	1970

TEST - ACHV

AUTHOR	DATE
BRAUN, ROBERT W.	1971
CAINES, JAMES R.	1968
DEMPSEY, DON G.	1972
FAUROT, LYLE M	1973
GOLDMAN, ROBERT C.	1971
HARRIS, ROBERT C.	1970
LYONS, RICHARD A.	1969
MC VICKER, HOWARD E.	1970
PRATZNER, FRANK C.	1969
WRIGHT, LAWRENCE S.	1954

TEST - ELEL

AUTHOR	DATE
HERRING, TOD H.	1962
HILL, EDWIN K.	1968
HOFER, JARREL	1969
JOHNSON, DOUGLAS H.	1969
KOUTNIK, PAUL G.	1968
LYONS, RICHARD A.	1969
MORGAN SR, LEO D.	1966
PRATZNER, FRANK C.	1969

TEST - MNIP

AUTHOR	DATE
CLAWSON, LA VERE E.	1967
COMER, JOHN C.	1970
GRANEY, MAURICE R.	1942
HOLM, MELVIN G.	1972
MOORE, BILLY M	1973
SWANSON, RICHARD A.	1968

TEST - SKIL

AUTHOR	DATE
MOORE, BILLY M	1973
SWANSON, RICHARD A.	1968

TRNG - IND.

AUTHOR	DATE
ANDERWALD, CARL J.	1947
ATTEBERRY, PAT H.	1954
BADER, LOIS	1932
BAKER, ALFRED E.	1943
BROPHY, JOHN M.	1947
BROWN, WALTER C.	1954
COCHRAN, GEORGE C.	1967
CRUDDEN, PAUL B.	1944
CUTLER, THEODORE H.	1948
DANAHER, EUGENE I.	1946
EVANCHO, MICHAEL	1947
FAULDS, VINCENT R.	1956
FLAHERTY, HUGH	1944
FRYKLUND, VERNE C.	1933
GOSSAGE, LOYCE C.	1967
IACOBELLI, JOHN L.	1969
KAPLAN, HAROLD	1956
LAND, SAMUEL L.	1931
LITTLE, RICHARD L.	1968
PEDERSEN, GEORGE L.	1957
ROSENQUIST, BARBARA	1971
SHEFFIECK JR, CHARLE	1969
SORENSEN, RONALD L.	1964
STEGEMAN, ARTHUR L.	1957
TIERNEY, WILLIAM F.	1952
TREGILGUS, EARL P.	1954
WHITE, STROLLER T.	1967
ZOOK, WAYNE H.	1968

VOGI - HS

AUTHOR	DATE
ALSUP, REA T.	1967
BAKER, TIM	1972
BLOMGREN, GLEN H.	1972
CLARK, CHARLES G	1972
COHEN, JERRY M.	1969
COHEN, LOUIS A.	1965
CRUMPTON, CHARLES R.	1952
D COSTA, AYRES G.	1968
DOERR, JOHN J.	1967
FRISBY, RUSSELL C.	1968
GREANEY, VINCENT M	1973
HAYES, BILLY D.	1968
HYDE, THOMAS E	1973
JENSEN, THOMAS R.	1968
JOHNSON, ROBERT O.	1968
JOHNSON, THOMAS P.	1967
KOHL, ERNEST O.	1949
KRUBECK, FLOYD E.	1954
KURTZ, HARMON H.	1959
LOWENSTEIN, NORMAN	1955
MARSHALL JR ,THOMAS C	1941
MASON, WILLIAM H.	1970
MORTON, BERRY E.	1950
PLUSCH, JAMES O.	1967
PRUSKI, JOHN	1958
REISENGER, RAYMOND H	1970
ROLLINGS, JAMES W.	1967
SAWYER, DAVID E.	1972
SCHULTZ, IRWIN J.	1949
SOLIMAN, ABDALLA M.	1967
STORMER, DONALD L.	1967
TATUM JR, JULIAN P.	1967
TODD, JOHN D	1972
VINCENT JR, WALTER C	1972
WERNER, WAYNE E.	1969

VOGI - EVPR

AUTHOR	DATE
ANDREWS JR, JOE R.	1968
BAIER, JON W	1973
BARROW, RICHARD W.	1969
BEACH, CHARLES K.	1941
BOTTOMS, JAMES E.	1965
BRIGHAM, ELDEN L.	1950
CHERRY, ROGER W	1972
CLEVELAND, JOHN M.	1961
CRAWFORD, JOHN E.	1941
CRUMPTON, CHARLES R.	1952
CUONY, EDWARD R.	1953
EISENBERG, WILLIAM L	1947
ENZIAN, HAROLD J.	1967
ERWIN, CLIFFORD H.	1963
GILBREATH, TOMMY D.	1971
GOSS, ANTHONY J	1972
HILL, FREDERICK W.	1942
HOBBS, ADDISON S.	1971
HODGSON, PAUL M.	1965
HORVATH, RONALD J	1973
HUTCHERSON, ETHEL M.	1966
JENSEN, THOMAS R.	1968
KURTZ, HARMON H.	1959
MASON, WILLIAM H.	1970
MEIER, MARY A.	1969
MORGAN, DARYLE W.	1968
NEWBURY, DAVID N.	1967
O NEIL, IVOR R.	1972
OGLE, LEWIS W.	1971
OGLESBY, JAMES R	1972
SHEPPARD, LAWRENCE E	1967
SHIBLES, FOSTER M.	1971
STENSON, ORVIS J.	1971
STORMER, DONALD L.	1967
STUART, WILLIAM R.	1972
THOMPSON, BRUCE L.	1971
WELSH, DONALD J.	1968
WIEHE, THEODORE E.	1954

VOGI - EVST

AUTHOR	DATE
CLAWSON, LA VERE E.	1967
CRAWFORD, JOHN E.	1941
FAUROT, LYLE M	1973
HANKIN, EDWARD K.	1947
HARLAN, OWEN	1953
HARVEY, DAVID W	1971
HEGGEN, JAMES R.	1967
JENKINS, FARRELL T.	1969
JOHNSON, DONALD H.	1966
KRUBECK, FLOYD E.	1954
LINNICK, IDA	1949
LOWENSTEIN, NORMAN	1955
LUTZ, RONALD J.	1969
PASSMORE, JAMES L.	1968
PHILLIPS, DONALD S.	1968
PLATA, MACIMINO	1971
PUFFER, KAREL	1971
REISENGER, RAYMOND H	1970
ROLLINGS, JAMES W.	1967
TATE, JOEL C	1972
THORPE, CLAIBURNE B.	1968
TODD, JOHN D	1972
WHINFIELD, RICHARD W	1969
WYNNE, ROBERT L.	1968

VOGI - JUCO

AUTHOR	DATE
BOLICK, GERALD M.	1968
BRADLEY, HARRY L.	1967
BRUE, JAMES E.	1969
COMBS, STANLEY L.	1948
DAUGHERTY, RONALD D.	1971
DE BORD, ROBERT F.	1972
GEARING, PHILLIP	1970
HAKANSON, JOHN W.	1967
HAYES, BILLY D.	1968
HELBERG, DONALD H.	1969
HORVATH, RONALD J	1973
JOHNSON, LEONARD R.	1971
KOLLIN, ROBERT	1971
MINKEVICH, GEORGE	1972
MORGAN, JIMMY B.	1969
OMAN, RONALD N.	1971
OSORNO, WENDELL A	1972
PUFFER, KAREL	1971
SHAW, GERALD H.	1968
SMITH, ROYAL E.	1969
STILLERMAN, MANUEL	1970
STROUT, GEORGE M.	1970
TATE, JOEL C	1972
THOMPSON, BRUCE L.	1971
THOMPSON, RANDALL L	1972
WALSTON, HARRY W.	1970
WANGER, RUTH	1971
WASHBURN, KENNETH R.	1971
WHINFIELD, RICHARD W	1969
WYNNE, ROBERT L.	1968

VOGI - PLAC

AUTHOR	DATE
BARNETT, LEONARD J.	1969
CAMBRIA, SOPHIA T.	1945
CHERRY, ROGER W	1972
COHEN, CHESTER G.	1970
CUONY, EDWARD R.	1953
ELMGREN JR, G. THEOD	1963
ERWIN, CLIFFORD H.	1963
FLUCK, BRYAN V.	1970
FRISBY, RUSSELL C.	1968
FULLER, FOSTER D.	
GALLAGHER, JAMES E.	1970
HAYES, BILLY D.	1968
HILLSMAN, SALLY	1970
JACKSON, THOMAS A.	1962
KEMELGOR, BRUCE H	1973
KISTLER, DALE E.	1971
MAC DONALD, MANLEY E	1944
MC CLURE, CLOIS A.	
NIENHAUS, BERNARD J.	1971
O CONNELL, JOHN F.	1971
ROBINSON, CLARK N.	1947
ROBINSON, ORIN R.	1965
ROSENQUIST, BARBARA	1971
SAINTY, GEOFFREY E	1972
SHERRELL, EUGENE G.	1969
STUART, WILLIAM R.	1972
TATE, JOEL C	1972
THOMPSON, RANDALL L	1972
TICHENOR, HAROLD D.	1967
TODD, JOHN D	1972
TREGO, JOHN W.	1958
VINCENT JR, WALTER C	1972
WANGER, RUTH	1971
WARNER, JAMES C.	1962
WASHBURN, KENNETH R.	1971
WERTHEIM, JUDITH B.	1971
WOMACK, WILLIAM M.	1971
WRIGLEY, MARGARET	1968
ZOOK, WAYNE H.	1968
ZUDAK, LAWRENCE S.	1969

VOGI - PRPL

AUTHOR	DATE
BERRY, JAMES W.	1972
BRAME, WILLIAM E.	1967
CLEVELAND, JOHN M.	1961
CRUNKILTON, JOHN R.	1969
CREW, ALFRED S.	1962
DUKES, GLENN F.	1969
FARNING, MAX C	1972
GELINAS, PAUL J.	1954
GORDON, KENNITH G.	1971
JOHNSON, LEONARD R.	1971
JURKOWITZ, EUGENE L.	1968
NEWBURY, DAVID N.	1967
NIENHAUS, BERNARD J.	1971
OGLE, LEWIS W.	1971
SHAW, GERALD H.	1968
STUART, WILLIAM R.	1972
WIJEYEWARDENE, JALUT	1960
WILBUR, LOUISE	1931
WOLLINGTON, JAMES M.	1966

VOGI - T.I.

AUTHOR	DATE
COOKE, ROBERT L.	1932
CRUMPTON, CHARLES R.	1952
DOERR, JOHN J.	1967
DROST, JIM L.	1970
FURLONG, JOHN	1957
HANEY, PHILIP H.	1949
MORGAN, DARYLE W.	1968
MOUTOUX, ALFRED C.	1948
OUTCALT, RICHARD M.	1971

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ACHV - ATTD - TEST

AUTHOR	DATE
LYONS, RICHARD A.	1969

ATTD - ADMN - COUN

AUTHOR	DATE
CORMACK, ROBERT B.	1970
DRAKE, JAMES B.	1972
MOSLEY, SAMUEL N.	1970
POTTER, DENIS A.	1973

ATTD - TEED - ADMN

AUTHOR	DATE
CORMACK, ROBERT B.	1970
FENDLASON, DONALD W.	1969
HARTZON JR, WILEY G.	1972
KOVACH, ROBERT V	1972
MAW, JAMES L.	1971
MOSLEY, SAMUEL N.	1970
PARKS, DARRELL L.	1968
ROBERTS JR, LEWIS	1972
RUSSELL, GENE H.	1970

CRCN - JRHS - EXCD

AUTHOR	DATE
WENTZ, CHARLES H.	1969

CRCN - TEED - HIED

AUTHOR	DATE
BAKAMIS, WILLIAM A.	1951
DAVIS, JIM L.	1966
KROH, DAMON K	1957
TAYLOR JR, HOUSTON	1968
THORNTON, ROBERT W.	1971

CURR - HIED - I.E.

AUTHOR	DATE
CRAWFORD, HAROLD W.	1960
REED, WILLIAM T.	1947
WALL, GUSTAVE S.	1951

CURR - TEED - EVPR

AUTHOR	DATE
BURTON, JOHN R	1970
CHATFIELD, WILLIAM D	1955
COLEMAN, WAYNE D.	1967
DUNCAN, GLENN S.	1950
HOOTS JR, WILLIAM R.	1966
HOOVER, ROGER L.	1967
JACKEY, DAVID F.	1933
MOSHIER, KENNETH D	1973
RUDISILL, ALVIN E.	1969
SEXTON, WILLIAM E.	1965
WINTERS, KENNETH W.	1970

EQIP - FINA - BDGT

AUTHOR	DATE
BUNTEN, CHARLES A.	1955

EXPR — CURR — JRHS

AUTHOR	DATE
REMICK, EDWARD L.	
SPENCE, WILLIAM P.	1957

EXPR FILM METH

AUTHOR	DATE
HAILES, CHARLES W.	1971
KRUPPA, JOHN R.	1968
LEMASTER, LELAN K.	1961
NEWTON, ROBERT E.	1970
SOMMER, SEYMOUR A.	1971
WILKES, DORAN F.	1966

EXPR - METH - I.A.

AUTHOR	DATE
CROWDER, GENE A.	1968
DE OLD, ALAN R.	1971
DU VALL, JOHN B	1972
FAZZINI, PHILLIP A.	1970
GETTLE, KARL E.	1970
HOFER, ARMAND G.	1963
ILOTT, JOHN F. D.	1969
JOLLY, FRANK H.	1970
KAUMEHIEWA, ALSON I.	1969
KOBLE, RONALD L.	1963
KRUPPA, JOHN R.	1968
LARUE, JAMES P.	1968
LUCK, WILLIAM E.	1966
MILLER JR, FRANK M.	1971
NEVITT, THOMAS A.	1966
NOTHDURFT, MARIE E	1972
PIERSALL, ARNOLD C.	1964
REPP, VICTOR E.	1970
SHULL, HOWARD I.	1969
STAMBOOLIAN JR, JOHN	1972
WAISNER, GARY L.	1970
WALGREN, FLOYD B.	1971
WRIGHT, WELCOME E.	1953

EXPR - METH - TCED

AUTHOR	DATE
ARMSTRONG, WILLIAM H	1967
HOLT, IVIN L.	1972
LINDEMEYER, RAY S.	1954
PORTER, CHARLES B.	1957
WILLEMS, ALVIN E.	1970

EXPR - METH - VOED

AUTHOR	DATE
ARMSTRONG, WILLIAM H	1967
BERTRAND, CLINT A.	1964
PUCEL, DAVID J.	1966
SCHACHT, ROBERT C.	1971

EXPR — PROG - METH

AUTHOR	DATE
ARMSTRONG, WILLIAM H	1967
BALZER, EUGENE W.	1972
BECKHAM, JOE W.	1969
BERTRAND, CLINT A.	1964
CAMPBELL, GORDON	1969
COLLIER, JAMES A	1973
GALLINELLI, JOHN W.	1970
GIERKE, EARL W.	1970
GRIFFITH, JOHN L.	1967
HAHN, MARSHALL S.	1967
HASKELL, ROGER W.	1969
HEYEL, CLARENCE L.	1967
HOCH, EMIL H.	1969
HOUSEHOLDER, DANIEL	1963
LEASE, ALFRED A.	1964
MANCHAK, PAUL J.	1965
MOEGENBURG, LOUIS A.	1969
NORTON, ROBERT E.	1967
PHILLIPS, THOMAS G.	1971
RICHARDS, KENVYN B.	1970
ROKUSEK, H. J.	1964
RUGGLES, STANFORD D.	1969
SEAL, MICHAEL R.	1969
SHULL, HOWARD I.	1969
SMITH, FREDDY J.	1970
STILLMAN, NEIL J	1972
WEFFENSTETTE, WALTER	1965

I.E. - METH - HS

AUTHOR	DATE
MANCHAK, PAUL J.	1965

MEDA - EXPR - HIED

AUTHOR	DATE
BABCOCK, JAMES G.	1969
SMITH, FREDDY J.	1970
WILKES, DORAN F.	1966
YEAGER, LOWERY D.	1965

METH - I.A. - HS

AUTHOR	DATE
ABROMAITIS, JOSEPH J	1969
BORRI, ROBERT	1942
LUCK, WILLIAM E.	1966
MC LONEY WIRT L.	1965
SVENDSEN, CLARENCE R	1970

PRPL - T.I. - METH

AUTHOR	DATE
ROSIN, WILLIAM J.	1969

PRPL - TCED - TEED

AUTHOR	DATE
MANESS, MARION T.	1969

PRPL - TCED - VOED

AUTHOR	DATE
ABDULLABI, BAKRI	1971
ALLEN, FLEET D.	1971
BESTOR, ROLLIE R.	1969
BURNS, RICHARD L.	1964
CHRISTENSEN, JAMES E	1972
COTTON, GEORGE R.	1944
CROMER, CHALMERS A.	1970
DAVIS, WARREN C.	1936
FISHER, RICHARD E.	1956
GLAU, JON E.	1970
GRAY, KENNEY E.	1970
GUDITUS, CHARLES W.	1965
HERMAN, JAMES A.	1969
HORVATH, WILLIAM	1972
JOHNSON, LEONARD R.	1971
KARNES, JAMES B.	1966
KEIM, WILLIAM E.	1966
LANGERMAN, PHILLIP D	1968
MANESS, MARION T.	1969
OLSEN, EUGENE A.	1968
PERKINS, NEAL B.	1962
SLATTERY, RAYMOND A.	1969
ZWEIBEL, MALCOLM C.	1968

READ - METH - EXPR

AUTHOR	DATE
FROELICH, DONALD M.	1970
HOUSEHOLDER, DANIEL	1963
LEASE, ALFRED A.	1964
RICHARDS, KENVYN B.	1970

TEED - TCED - EVFA

AUTHOR	DATE
ANDREYKA, ROBERT E.	1969
GIANINI, PAUL C.	1968
HOLMEN, HOLGER E.	1969

TEED - VOED - EVFA

AUTHOR	DATE
ARNOLD, DANIEL S.	1968
CAIN, JOHN N.	1970
FAHRLANDER, DANIEL C	1973
FORREST JR, LEWIS C.	1970
OLIVER, WILMOT F.	1967
SUTTON, FRED C.	1961

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Abshire (Last name), Allison (First name), Joseph (Middle name)

Exact Title A Study of Dropouts in Louisiana Vocational-Technical Schools

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 185

Granted by The Louisiana State University (Name of institution) Baton Rouge, Louisiana (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose

The primary purpose of this study was to obtain data about dropouts in Louisiana Vocational-Technical Schools that could be useful in efforts to overcome this problem. Specific objectives were: (1) to determine some characteristics of dropouts, (2) to pin-point major causes of dropout, (3) to discover factors that may encourage longer tenure in school, (4) to learn the occupational status of dropouts, and (5) to make recommendations which might be helpful in diminishing the problem.

Procedure

The descriptive method using the survey technique was the research procedure followed. Data were obtained primarily from three sources: school records, school directors and dropouts. Questionnaires were completed by dropouts and by school directors. Additional information was secured through interviews with vocational education leaders at the state level, vocational-technical school directors, personnel, students and dropouts. Visits were made to many schools to get a good view of their total operation.

Findings

Dropouts included males and females, married and single pupils, students of all ages enrolled, and students from all courses taught. A majority of respondents quit school during the first six months of training.

Data from this study show a direct relationship between the dropout problem and the following eight factors:

1. Insufficient funding resulting in inadequate facilities and equipment, and shortage of personnel.
2. Low economic status of many parents.
3. The desire for employment by many students.
4. Lack of self-discipline by many students reflected in excessive absences, lack of motivation, unsatisfactory progress, and disciplinary problems.
5. Marriage or marital plans.
6. Illness or physical disability of students or immediate family members.
7. Lack of encouragement, personal interest, and individual assistance by some instructors.
8. Lack of vocational training and guidance in secondary schools to assist students in making wise training or career choices in vocational-technical school.

No relationship was found between the dropout problem and the following factors:

1. The attitudes of parents regarding education.
2. The educational level of parents.
3. Prior educational level of dropouts.
4. Learning ability of dropouts.

Factors that would have encouraged students to remain in school longer included the following:

1. More part-time jobs for students.
2. More financial aid such as loans, scholarships, assistantships and grants.
3. Better facilities, equipment and teaching aids.
4. More guidance, encouragement and asistance by school personnel.
5. Extra curricula activities.

Of the 180 respondents, 10.54 per cent were unemployed. Those employed were working in 62 different kinds of jobs. Many of these were low paying jobs. More respondents were doing secretarial work than any other type of work. Only 50 per cent of the dropouts indicated satisfaction with present job.

Order No. 72-23,324, 185 pages.

33: 2248-A Nov. '72'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Aldrich (Last name), Daniel (First name), Gaskill, III (Middle name)

Exact Title An Analysis of Vocational Program Costs

Degree granted Ph. D., Date 1972, No. of pages in report 178

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Problem: In the 1968 Vocational Education Amendments, several changes were made in traditional vocational education policy. One of the most important of those was that states would now have to allocate federal vocational funds to local districts in terms of manpower needs, district wealth, and program costs. A 1970 survey of fifteen states revealed that costs of vocational education programs were not being adequately identified. A review of the literature also revealed that further research was needed in determining vocational program costs. This study was conceived to assist state and local educational administrators in determining and estimating those costs.

Procedures: To ascertain accurate vocational program costs and their estimates required development and identification of a program accounting structure; procedures for prorating indirect costs; a unit for cost comparison; and a cost-estimation formula. The resulting accounting structure identified four distinct levels: District, General Service Grouping, Service Grouping, and Program Grouping. The General Service Grouping was subdivided into Direct Instruction, Indirect Instruction, and Non-instruction, or costs not charged to instruction. Those three services provided the basic framework into which traditional budget structures could be classified. That framework enabled clear identification of the indirect costs: Instructional Support, General Support, and Plant Operation and Maintenance.

Allocation of the above, in proportion to the burdens created by a program, required identification for each cost of an appropriate proration variable. Annual Student Contact Hours, Number of Full-Time-Equivalent Teachers, and Classroom Square Footage, respectively, were identified as best accomplishing that task.

Program unit costs, for purposes of cost comparisons, were determined by using the Annual Student Contact Hour as the base unit of measurement.

The above procedures were applied in gathering 1969-70 data from a sample of three high school districts and one community college district in each of seven states. The determined program unit costs were used to test the effectiveness of the program cost-estimation formula. That formula assumed that vocational program costs per student contact hour were equal to the average instructional cost per annual student contact hour times the ratio of the average class size for all services to the average class size of a vocational program, plus a program factor.

The effectiveness of the formula was determined by comparison of the sum of the squared differences between the actual program cost and mean program cost with the sum of the squared differences between the actual program cost and formula-estimated program cost. In addition, the variable relationships of the formula were examined by an analysis of the correlation coefficients among the formula variables.

Findings: The data gathered and analyzed from the sampled districts revealed: 1. Teachers' salaries comprised the largest percentage of the total cost of a vocational service. That percentage was followed by the indirect cost percentages for General Support and for Plant Operation and Maintenance. 2. Community college districts spent larger percentages of total vocational cost for instructional equipment replacement, rental, and maintenance than did high school districts. 3. All vocational program and industrial arts service current unit costs were higher than current unit costs of other instructional programs. 4. Community college mean other instructional program and mean vocational unit costs were approximately twice the high school mean other instructional program and mean vocational unit costs. 5. Deviations about the program mean costs were large. 6. The cost-estimation formula proved generally ineffective.

Recommendations: 1. Specific federal guidelines should be established for prorating indirect costs among instructional programs. 2. State vocational administrators should thoroughly examine vocational instructional equipment replacement and maintenance policies within their states. 3. State vocational administrators should conduct cost-effectiveness studies that compare high school and community college vocational programs. 4. State and federal legislators should strongly consider increasing vocational current categorical support to include the current cost of industrial arts service.

Order No. 73-6371, 178 pages.

(33: 4701-A) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Allen (Last name), Cameron (First name), Kent (Middle name)

Exact Title The Development of Industrial Arts in the Intermediate School, 1909-1971.

Degree granted Ed. D., Date 1973 No. of pages in report 292

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To trace the development of Industrial Arts in the junior high and middle school.

Source of data and method of study: Sources were professional journals, government documents, interviews, taped lectures, and examination of the Bennett and Wahlstrom Collections at Bradley Universtiy, Peoria, Illinois. The historical method of study was used.

Findings and Conclusions: Some of the conclusions drawn from this study indicated that American intermediate schools and industrial arts at this level have succeeded as permitted by local influences. The basic objectives and philosophy of junior high/middle school industrial arts has been defined and distributed to practitioners for many years. However, many teachers did not construct their programs to meet all objectives. The failure to strive towards all objectives was the result of practitioner's inability to fully understand and implement basic philosophy and objectives.

Although a certain degree of failure must be noted, intermediate school industrial arts may accept compliments for its success in certain specific areas. For example, many of the career education concepts set forth by the U.S. Office of Education were an established part of intermediate school industrial arts from the founding of the first junior high schools. Industrial arts has been a leading innovator and supporter of career education for over 60 years.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Allen (Last name), Dell (First name), K. (Middle name)

Exact Title Curriculum Performance Objectives for Manufacturing Engineering Technology

Degree granted Ed. D., Date 1973 No. of pages in report 241

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To identify acceptable common core performance objectives for the baccalaureate Manufacturing Engineering Technology curriculum.

Source of data and method of study: A survey was conducted of 1970 and 1971 Manufacturing Engineering Technology graduates of 12 institutions, manufacturing educators, and manufacturing managers using a 218 item questionnaire. Responses were statistically analyzed and submitted to a jury of experts for evaluation. Performance objectives were developed for highly rated items.

Findings and Conclusions: A core of performance objectives was identified as representing the manufacturing engineering technology discipline. Selected performance objectives clearly differentiate between manufacturing engineering technology and other related manufacturing job functions.

Predominant emphasis of objectives is in Manufacturing Process Planning, Manufacturing Supervision, Manufacturing Development, and Production Tooling.

Current graduates are apparently well prepared for industry with 97.9 per cent of the sample employed in manufacturing and 48 per cent held job titles of "Manufacturing Engineer." The average graduate was 26.5 years old and had 3 years of industrial experience at the time of graduation.

Manufacturing Engineering Technology curricual show strong influences from ECPD and ASEE accreditation guidelines and recommendations.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Amaro (Last name), James (First name), Paul (Middle name)

Exact Title A Comparative Analysis of the Status of Technological Education on a Baccalaureate Level in the State of Alabama

Degree granted Ph. D., Date 1973, No. of pages in report 200

Granted by The University of Alabama (Name of institution) University, Alabama (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

There is a need for additional data to clarify the position of Alabama in technological education, specifically at the baccalaureate level. A review of the literature relating to technological education reveals that a growing need for technologists with education beyond the two-year college level is felt in most parts of the United States. Leaders in education, industry, and government consistently point to the development of such education as a trend for many years and a necessary direction for the future. Although high school and two-year college programs will continue to be quite important in technological education, the literature repeatedly refers to the need to complement these efforts with technology programs at the baccalaureate level through institutes of technology, "two-plus-two" cooperative plans, or other means. Many institutions throughout the country, including those in southeastern states, have responded to this challenge. Programs at the Southern Technical Institute of Georgia Tech and at Memphis State are examples of this recent educational effort.

Alabama was found to have only three accredited programs leading to baccalaureate degrees in specific technologies, suggesting a need for research to determine whether the needs of the state in technological education were being met. A research project was executed in which closed-form questionnaires, supplemented by interviews, were used to elicit the views of Alabama educators, political leaders, and industry representatives regarding the state's present and future needs in technology education, specifically at the baccalaureate level. A total of 1165 questions were tabulated and analyzed.

The findings clearly indicated that there is a felt need for more and better-educated technologists in Alabama and a belief that baccalaureate-level technology programs are one way to fill this need. The persons responding seemed clearly willing to support the establishment of such programs, including an institute of technology. There were some reservations about funds and some differences of opinion as to where an institute of technology should be located, but there was clear overall support for more baccalaureate-level technology education in Alabama.

In view of these findings, it is recommended that leaders in education, industry, and government work together to overcome whatever political obstacles there may be to the establishment of technology programs at the baccalaureate level in the state.

Order No. 73-27,280, 200 pages.

34; 2185-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Arbelo-Atiles (Last name), Rafael (First name), Celedonio (Middle name)

Exact Title Effectiveness of the Talkback and Group Discussion in Supplementing Educational Television in Teaching Consumer Education to Employees of Welfare Agencies

Degree granted Ph. D., Date 1972, No. of pages in report 180

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to compare the effects of (1) television instruction alone, (2) television instruction followed by a talkback session (TV+TB), (3) television instruction followed by a group discussion session (TV+GD), and (4) a combination of television, talkback, and group discussion (TV+TB+GD).

Experimental Design

The University of Connecticut presented a series of TV programs in selected areas of consumer education. Five 30-minute programs were aired. The programs were transmitted over Connecticut Public Television. The prime purpose of this project was to help Connecticut community leaders who work with low-income families effectively teach selected areas of consumer education. These community leaders constituted the population of this study.

Viewing centers were organized in 40 locations throughout the State. From the aforementioned population, a sample of 152 subjects was randomly selected for this study.

The experimental design selected for this study was the pretest-posttest group design. The treatment of the groups was as follows:

a. Group 1 = five 1/2 hr. TV only
b. Group 2 = five 1/2 hr. TV + five 1/2 hr. TB
c. Group 3 = five 1/2 hr. TV + five 1/2 hr. GD
d. Group 4 = five 1/2 hr. TV + five 1/2 hr. TB + five 1/2 hr. GD

Results

In the comparison between the viewing groups, the findings were as follows: (1) A significant difference was found when (a) the TV only was compared to the TV+TB+GD viewing group and (b) the TV+TB was compared to the TV+TB+GD viewing group. (2) No significant difference was found in the comparison of the following groups: TV only vs. TV+TB, TV only vs. TV+GD, TV+TB vs. TV+GD, and TV+GD vs. TV+TB+GD.

In each viewing group, those participants who viewed 4 or 5 TV programs were compared to those who viewed 3 programs or less. The findings were: significant differences were found in the four viewing groups in favor of those people who viewed 4 or 5 programs.

A chi-square test was used to determine the interaction, if any, between selected characteristics of students and their achievement. The findings were: (1) In one viewing group, females learned significantly more than males. (2) In another group, those participants who live in an urban area learned significantly more than those who live in a suburban area. (3) In two viewing groups, those participants who had less than high school education learned more than those who had completed high school or more. (4) In one group, those participants whose years of experience were under the mean years of experience of the group learned significantly more than those whose years of experience were over the mean of the group.

No significant interaction was found between achievement and the following characteristics in any one of the four viewing groups: race, marital status, age, and income.

Conclusions

The data collected in this investigation offer statistical evidence to substantiate the following conlcusions: (1) The combination of TV, TB, and GD resulted in greatest achievement in this investigation. (2) In comparing the effects of TV, TV+TB, and TV+GD, no evidence was found to indicate that one treatment is more effective than the others. (3) The four treatments used in this investigation were highly effective in teaching selected areas of consumer education to Connecticut community leaders. (4) Those participants who watched the most programs learned the most. (5) No significant interaction was found between achievement and the following selected characteristics: race, marital status, age, and income. (6) Regarding sex, residence, level of education, and years of experience, there is no basis for either acceptance or rejection of the null hypothesis of no significant interaction, since the findings of significance were only in isolated instances, but not for the total population.

Order No. 72-32,198, 180 pages.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Arora (Last name), Mehar (First name), C. (Middle name)

Exact Title Methodology for Establishing Production and Cost Functions of Vocational Education Programs. (Volumes I and II)

Degree granted Ph. D., Date 1973, No. of pages in report 509

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study is primarily concerned with the methodology of establishing production and cost functions of education which could be utilized for educational planning and decision-making at an institute level. Models of educational planning are developed which utilize the production functions of educational and non-educational services to estimate the input needs of an institute in terms of faculty, staff, space, equipment and supplies. The estimation of inputs required for instructional services are based on student demand for various courses, which depends upon the program requirements of various required and elective courses, students' progress and attrition rates as they move towards graduation, and the class size policies. The production functions of the sections of various courses are aggregated linearly to estimate the production functions of a course, an educational program, a department, and the institute. The methodology to establish such functions, the variables affecting such functions and the problems associated with establishing such functions are discussed.

Machine Shop Program offered at Fox Valley Technical Institute, Appleton, Wisconsin has been used to test the validity of the planning models. Two types of production functions have been used in the empirical study; firstly, based on historical data; and secondly, based on hypothetical optimal class size policies. The empirical study showed that generally the historical inputs used per student for instructional services in Machine Shop Program decreased continually from 1965 to 1970 mainly due to a continuous increased enrollments leading to classes of optimal sizes. The faculty inputs used per student based on hypothetical optimal class size increased continually from 1965 to 1970 mainly due to a continuous decreased teaching load policies. The hypothetical production functions are primarily designed for administrators interested in assessing the impact of various policy parameters on the input resource needs of an institution.

A mathematical model to estimate the number of students to be enrolled in various educational programs in order to utilize optimally the available input resources for instructional services has also been formulated. This model, however, has not been tested empirically.

The methodology to establish average cost per student by program has been discussed. This is achieved by pricing the inputs of the production functions of programs at the current market prices and as such gives a detailed breakdown of costs by each type of input. The detailed procedure of costing various inputs to arrive at standard cost has been discussed. Machine Shop Program offered at Fox Valley Technical Institute, Appleton, Wisconsin has been used to validate the methodology of establishing standard cost of the program. The empirical study showed that generally the cost per student decreased from 1965 to 1970 in spite of the raises in faculty salaries and decreases in teaching loads. This is again due to continuously increased enrollment leading to optimal class sizes.

Procedures and the problems associated with establishing cost functions for budgeting, incremental and marginal costs for planning and decision-making, and economies of scale for educational planning at state level have also been discussed. These procedures, however, have not been empirically tested.

Order No. 73-25,576, 509 pages.

34: 2187-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Baier (Last name), Jon (First name), Wesley (Middle name)

Exact Title Status of Industrial Arts in Colorado as Perceived by Junior High Principals, Industrial Arts Teachers, and Counselors

Degree granted Ed. D., Date 1973, No. of pages in report 194

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of Study

The purpose of this study was to determine what junior high industrial arts teachers, counselors, and principals in Colorado believe should be and currently is emphasized in industrial arts programs, the status they assign to industrial arts, and how these groups value the AVA's 1953 and 1968 goals.

Procedures

Data for this study were obtained by the use of questionnaires sent to 90 industrial arts teachers, 125 counselors, and 90 principals. Two hundred forty-four, or 80 per cent, usable questionnaires were returned. Data from respondents were analyzed by frequency of responses, percentage of responses, means, standard deviations, and correlation coefficient statistical values.

Findings

Twenty behavioral statements derived from the AVA's 1968 goals were rated by industrial arts teachers, counselors, and principals both as to the emphasis they should be and currently are given in industrial arts programs. High agreement between respondents was found in both ratings although the should be emphasized category rated much higher.

Respondents rated the 1953 and 1968 AVA goals as to importance. All three groups placed the same 1953 goals in the upper, middle, and lower thirds of a rank order. Goals 3, 5, and 6 were in the upper; Goals 2, 7, and 9 in the middle; and Goals 1, 4, and 8 in the lower. Complete agreement was found on the importance of the 1968 goals. From highest to lowest in rank order were Goals 4, 5, 2, 1, and 3.

The rated importance of the 1968 AVA goals was correlated with how respondents rated the twenty derived statements and it was found that responses were reliable and that these sections of the questionnaire were valid.

Industrial arts teachers, counselors, and principals all agreed that the AVA's 1953 statement of goals is more descriptive of industrial arts programs as they presently exist and as they should be taught than is the 1968 statement.

The status of industrial arts was obtained by having respondents compare its importance to eleven other subjects commonly found in junior high schools. Industrial arts was considered more important than 60 per cent of the other subjects.

Variables identified in the study had only a limited impact on responses to various sections of the questionnaire.

Conclusions

The following conclusions were drawn from the data received:

1. More work needs to be expended by industrial arts teachers, counselors, and principals to narrow the gap between the emphasis that should be given the goals of industrial arts and current emphasis.
2. Industrial arts programs should not be cut back in school systems contemplating a decrease in course offerings to meet budget demands.
3. The American Vocational Association's 1968 statement of goals for industrial arts should not be considered a replacement for, nor more popular than, their 1953 statement.
4. Variables such as school enrollment, age, and sex play a relatively minor role in the determination of an educator's beliefs regarding industrial arts.
5. The high degree of agreement between industrial arts teachers, counselors, and principals regarding the value and status of industrial arts should provide the basis for effective cooperative endeavor.
6. The development of basic skills is highly valued among educators as a goal for industrial arts and should not be left only to accidental achievement.
7. This study demonstrates a valid and reliable method of determining an educator's beliefs about what should be emphasized in a particular subject area as opposed to current emphasis.

Order No. 73-16,790, 194 pages.

34: 205-A July '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Baker (Last name), Tim (First name), (Middle name)

Exact Title The Association Between Varying Degrees of Vocational Trade and Industrial and/or Technical Education and the Subsequent Early Career Patterns of High School Graduates

Degree granted Ed. D., Date 1972, No. of pages in report 99

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

SCOPE AND METHOD OF STUDY: The study was primarily concerned with identification and examination of selected aspects of early career patterns of selected 1967 Oklahoma public high school graduates. The subjects were surveyed twice in an effort to determine possible associations between varying degrees of vocational trade and industrial and/or technical education completed to subsequent early career patterns developed over a four-year period. Three groups of subjects were drawn from the total population determined by the number of semesters of trade and industrial and/or technical education each had received while in high school. The groups were those who had: (1) completed four or more semesters, (2) completed one to three semesters, (3) had no vocational education of any kind while in high school. Subjects comprising the three groups were subsequently surveyed twice in post-graduation follow-up efforts to determine: (1) employment status, (2) acceptance of first jobs offered, (3) hourly rate of pay, (4) military service status, (5) advanced training or schooling status, (6) extent of advanced training, and (7) number of college credit hours earned. Chi-square statistical analyses were applied to data gathered four months following graduation and to data secured from the same subjects four years following graduation. Fourteen null hypotheses were tested and accepted or rejected at the .05 level of confidence.

FINDINGS AND CONCLUSIONS: Five findings emerge from the study: (1) There was significant difference among the groups surveyed in the category of employment status four months following graduation when the responses were full-time, part-time, and not employed. (2) There was a significant difference among the groups in employment status four months following graduation when the responses were employed and not employed. (3) There was a significant difference four months following graduation among the groups in the category of advanced training or schooling. (4) There were no significant differences among the groups, either four months or four years following graduation, in the categories of: (a) military service status, (b) acceptance of first job offered, (c) wage per hour secured, (d) extent of advanced training. (5) There were no significant differences among the groups at the four-year level in either (a) employment status, (b) advanced training or schooling, or (c) number of college credit hours received.

ADDITIONAL IMPLICATIONS WERE: (1) More vocational training may tend to provide for more full-time employment, (2) subjects who had vocational training tend to meet their military obligations sooner than non-vocational subjects, (3) non-vocational subjects enrolled in college more often than vocational subjects, and (4) vocational subjects enrolled in trade or technical schools for advanced training more often than did non-vocational.

Association between varying degrees of trade and industrial and/or technical education completed and subsequent career patterns was found only at the end of the four month time period and then only in employment status and advanced training or schooling status. No significant association was noted in any other specific aspect of the career pattern at the end of the four month period and no significant association was noted in any of the career patterns at the end of the four year period.

Order No. 73-15,050, 99 pages.

33: 6797-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Baltimore (Last name), Jimmy (First name), Ray (Middle name)

Exact Title A study of Professional Education Competencies of Public School District Vocational Education Leaders

Degree granted Ed. D., **Date** 1972, **No. of pages in report** 138

Granted by Oregon State University (Name of institution) Corvallis, Oregon (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The Purposes of the Study

The primary purpose of this study was to identify common professional education competencies needed by public school district vocational education leaders. Other purposes were to (1) determine if significant differences existed in vocational education leadership competencies among respondents as categorized by state, type of position held, proportion of time devoted to teaching, and number of teaching subordinates, (2) identify the method recommended by respondents for preparing individuals to perform each competency included in the study, and (3) formulate implications to be considered in the development of teaching strategies and curriculum for the preparation of public school district vocational education leaders.

The Procedures

The data were collected with a mail survey questionnaire developed through a review of literature and a field test. Public school district vocational education leaders responded to the questionnaire regarding the level of proficiency (complete, considerable, moderate, slight, no proficiency) necessary for each of the 98 competencies in relation to their job. Likert-type scale values of 5 to 1 were assigned to the responses. Respondents also selected a method (course work, internship, a combination of course work and internship) for preparing personnel to perform each competency.

The study utilized a population from the four western states of Arizona, California, Colorado, and Washington. One hundred and three of the 112 public school districts which met predetermined criteria agreed to participate in the study. A sample of 200 vocational education directors and department heads was randomly selected from the participating districts. Usable data were received from 147 respondents. The data were analyzed with the analysis of variance F statistic and the Q- and R-factor analytic techniques.

Selected Findings

Statistical comparisons using the one-way classification analysis of variance were made on respondents who were grouped by state, position held, proportion of time devoted to teaching, and number of teaching subordinates. Respondents grouped by state were alike in their rating of all 98 competencies. Differences were detected with the remaining groups, leaving 62 common competencies.

The Q-technique factor analysis revealed that all respondents generally resemble one another with regard to values assigned to the professional education competencies in the study.

The R-technique factor analysis was used to group competencies for development of teaching strategies and curriculum. A five-factor solution extracted 59 competencies that had factor loadings greater than ±.50. The five factors were identified as follows:

1. Factor I: Program Management
2. Factor II: Program Planning, Development, and Evaluation
3. Factor III: State Criteria Interpretation
4. Factor IV: Staff Management
5. Factor V: Staff Relations

For each of the 98 competencies, a majority of the respondents selected a combination of formal course work and intership as the preferred method of preparing vocational education leaders to perform the competencies in the study.

Selected Conclusions

The review of literature, the questionnaire, and the results of the statistical analysis provided the basis for the following conclusions:

1. Sixty-two competencies were similar for all respondents and make up the common competencies.
2. Competencies related to Staff Management and Staff Relations received relatively high mean scores and low standard deviations, indicating general agreement that a high level of proficiency is needed.
3. Competencies related to Program Management and Program Planning received relatively low mean scores and high standard deviations, indicating a difference of opinion among the respondents concerning the level of proficiency, but generally it was considered to be low.
4. Respondents grouped by state were alike in their rating of all 98 competencies.
5. A combination of formal course work and internship was the preferred method of preparing vocational education leaders to perform the competencies in the study.

Selected Recommendations

The following three selected recommendations are offered in view of the findings and conclusions of the study:

1. Where identifiable groups are involved in vocational education leadership training, responses of individuals representing that group in this study should be examined. Those competencies rated high by that group should receive preference in curriculum planning.
2. Experimentation should be conducted with the identified competencies to compare the effectiveness of the individualized, performance-based method of instruction and the traditional method of instruction.
3. A composite data analysis should be completed on the concurrent studies by Baltimore (1972), Martin (1972), and Sundstrom (1972) to ascertain similarity of results. If strong similarities exist, it is recommended that the western states cooperate in establishing vocational education leadership programs with a common competency base.

Order No. 72-27,620, 138 pages.

33: 2248-A November 72

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Banzhaf (Last name), Robert (First name), Arthur (Middle name)

Exact Title The Technology of Graphic Arts: A Curriculum Resource Study for Industrial Arts Education

Degree granted Ed. D., Date 1972, No. of pages in report 286

Granted by North Carolina State University (Name of institution) Raleigh, North Carolina (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The technology of graphic arts is a chronological report of the tools, materials, processes, and machines invented by man from the beginning of ethnographic time to 1971. Also included is a review of the technology of graphic arts in the future. Since it is a resource study, primarily intended for the study of graphic arts in an industrial arts education program, it is limited to that material necessary for a teacher of, or a student in General Education.

The major areas covered include the relief, planographic, and intaglio methods of printing, and their relationships to each other as they were invented and developed. The types and kinds of printing presses are discussed in relation to their uses by one of the above methods. Similarly, the invention and use of movable type and other printing plates, as well as printing inks, parallel the development of printing presses. The remaining major area included is the invention and development of paper.

In addition to a review of the above, the study also discusses the manufacture of books and newspapers, photography, copying and copiers, specialty printing techniques, and holography. Other facets of a cross-technological nature, such as cathode-ray, photo-electric, type composing, and computer-directed, automated "belt press" systems complete the history of the technology of graphic arts.

The final unit applies the technology of graphic arts to the functions of industrial arts education. These functions are the cultural, consumer, technical, recreational, social, and occupational. Order No. 73-1185, 286 pages.

33: 3342-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Barstow (Last name), Robbins (First name), Wolcott, Jr. (Middle name)

Exact Title The Effectiveness of Guidelines Without Legislation in Teacher-School Board Negotiations

Degree granted Ph. D., Date 1967, No. of pages in report 270

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

A key controversy in education in the United States during the 1960's was whether or not legislation was necessary to secure the effective implementation of collective negotiations between boards of education and local teachers organizations.

The purpose of this study was to determine the effectiveness, in the absence of legislation, of voluntary guidelines in bringing about the cooperative determination of teacher salary schedules and other school personnel policies through negotiation and agreement.

For this study the author made an extensive survey and analysis of existing working relations between boards of education and local teachers organizations in all of the 177 school districts in the state of Connecticut during the school year 1963-1964, prior to the enactment in 1965 by the Connecticut legislature of a teacher negotiation law.

Connecticut was selected for this study because, as a result of continuing cooperative efforts since 1951, a detailed set of voluntary guidelines for teacher-school board negotiations had been developed and endorsed by the state school boards', superintendents', and teachers' associations and published in 1962 and widely promulgated by the State Board of Education.

To study the effectiveness of such guidelines, without legislation, nine major areas of inquiry were identified. They were: (1) board of education policies, (2) teacher representation, (3) joint teacher-board meetings, (4) role of the superintendent, (5) topics considered at joint meetings, (6) meeting procedures and the reaching of agreement, (7) group contracts, (8) fiscal impediments and teacher withholdings, and (9) evaluations of teacher-board working relations.

On the basis of guideline recommendations, one or more goals were established for each of these areas. The effectiveness of voluntary guidelines in each area was assessed by determining the percentage of Connecticut's school districts where each goal was found to have been implemented in 1963-1964, prior to the enactment of legislation.

A detailed questionnaire based on the accepted state guidelines was sent by the author in May 1964 to each superintendent of schools, each local teachers organization president, and each local board of education chairman in Connecticut. Out of a possible 550 returns, 425 usable replies were received, including at least one from every district in the state.

Results of the survey were analyzed and reported in detail in a separate chapter for each of the nine major areas of inquiry. Data were recorded for all districts together, and for large and small districts separately.

The central fact emerging from this study was that, despite the wide promulgation of voluntary guidelines, in only 50 per cent of Connecticut's school districts (88 out of 177) was the teachers' salary schedule for 1964-1965 established by mutual agreement through negotiation at joint teacher-board meetings. In the other half of the districts, in the absence of legislation, school boards adopted the schedule unilaterally.

In only 25 per cent of Connecticut's school districts was agreement on any non-salary personnel policy reached through joint-meeting negotiation in 1963-1964. In only 2 per cent of the districts were salary or non-salary agreements embodied in a jointly signed group contract.

On the other hand, joint teacher-board meetings were held in 1963-1964 in 90 per cent of Connecticut's school districts. Salaries were discussed at joint meetings in 85 per cent of the districts, and non-salary personnel policies in 81 per cent.

The author concluded that without legislation guidelines were highly effective in producing joint teacher-board meetings and deliberations, but they were relatively ineffective in producing bona fide negotiations and written agreement.

The author recommends that a comparable study be made of the effectiveness of legislation in teacher-school board negotiations. Microfilm $3.50; Xerography $12.15. 270 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Bayne, George, Keith
(Last name) (First name) (Middle name)

Exact Title The Role of the Local Director of Occupational Education as Perceived by Superintendents, State Division of Vocational and Technical Education Staff and Occupational Education Directors

Degree granted Ph. D., Date 1972, No. of pages in report 115

Granted by Southern Illinois University Carbondale, Illinois
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to investigate the amount of agreement and disagreement existing among directors of occupational education, LEA superintendents, and Illinois Division of Vocational and Technical Education (DVTE) staff, regarding the role of occupational education directors.

This study was concerned specifically with the following: 1. Determining the specific role expectations in which there was agreement and disagreement among local directors, LEA superintendents, and the Illinois Division of Vocational and Technical Education staff. 2. Determining the functional areas in which the role expectations were agreed upon by local directors, LEA superintendents, and Illinois Division of Vocational and Technical Education staff. 3. Describing how the three groups differ in role expectations. 4. Determining combined rank ordering or priorities of role expectations as seen by the local directors, LEA superintendents, and the Illinois Division of Vocational and Technical Education staff.

The Q-methodology was the research procedure used in this study. This technique is particularly adaptable when using small numbers or studying similarities and differences within and between groups.

The Q sort developed for this study consisted of 63 items. Each item was a behaviorly stated competency which had been identified in previously conducted research, and was considered essential to the operation and administration of an occupational education program. The Q sort was administered to 15 local directors of occupational education, 15 LEA superintendents, and 15 Division of Vocational and Technical Education (DVTE) staff members in the state of Illinois. The respondents were asked to place the 63-items in a retangular distribution of nine categories with seven cards in each category.

The findings of the study indicate a high degree of agreement between local directors and DVTE staff. These two groups agreed on the ranking of 60 of the 63 items. Local directors and superintendents were in agreement on 54 of the 63 items. The superintendents and the DVTE staff were in agreement on 53 of the 63 items.

The items of disagreement, which were ranked higher by the superintendents, dealt with the coordination of occupational education with other educational activities to maintain unity and balance between general education and occupational education. The development of curriculum objectives and the need to develop criteria to evaluate facilities and equipment were also ranked higher by the superintendents.

The use of outside resource people and advisory committees was given a significantly higher ranking by the local directors and DVTE staff than by the superintendents. The DVTE staff and local directors disagreed on the importance of providing communication channels for sharing of ideas among teachers. They also were in disagreement about the priority to be given the task of promoting unity and balance between occupational education and other disciplines. The DVTE staff along with the superintendents rated these role description statements higher than did the local directors.

The local directors and the DVTE staff ranked the Administrative functional area higher than did the superintendents. On the other hand, the functional area of Research was given a higher priority by the superintendents than did the local directors.

The establishment of a sound philosophy for occupational education, the determination of curriculum objectives, the selection and use of equipment and facilities, and the evaluation of program and instructional staff are examples of items given a higher priority. Administrative duties such as writing proposals, interviewing teacher candidates, working with lay advisory groups are also viewed to be significantly above the mean.

Role definition statements which deal directly in securing on-the-job training stations, interpretation of student occupational interest inventories, and other similar activities have been given a low priority rating.

Order No. 73-6182, 115 pages.

(33: 5050-A) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Beck (Last name), Paul (First name), A. (Middle name)

Exact Title A Modified Convex Simplex Algorithm for Geometric Programming with Subsidiary Problems

Degree granted ______, Date 1971, No. of pages in report ______

Granted by Rensselar Polytechnic Institute (Name of institution) Troy, New York (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of Study: To present the implementation of a geometric programming algorithm applied to the dual program and subsidiary maximum problems. The subject of canonical programs and the primaldual relationships pertinent to this research are discussed, and the linear nature of the dual program constraint region is emphasized.

Source of Data and Method of Study; The technique developed for the numerical solution of the geometric programming dual program was a modified convex simplex method algorithm. Special attention had to be paid to the handling of the "blocks" of dual variables associated with inactive primal constraints. The algorithm which was developed is capable of handling programs with any number of degrees of difficulty, and any number of active or inactive constraints in the primal program.

Findings and Conclusions: One of the main problems associated with geometric programming is the nondifferentiability of the dual program objective function on the boundary of the nonnegative orthant. This gives rise to computational problems when dealing with geometric programs having inactive constraints. The technique developed for this research permits any or all of the primal constraints to be inactive, and automatically implements the subsidiary maximum problem chain when required. Certain restrictions are placed on the behavior of the dual vector to guarantee differentiability of the dual objective function, for every move in the dual space dictated by the algorithm. These restrictions do not, however, prevent the dual variables, which correspond to the inactive constraints, from going to zero.

Several sample·problems were solved on an IBM S/360 Model 50 computer. The degree of difficulty for the sample problems ranged from zero to forty, and the computer times required to arrive at a satisfactory solution ranged from one-half second to seven minutes. Some observations are included on the subject of subsidiary maximum problems, and on the computational experience gained from the use of the computer code developed during this research.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Berry (Last name), James (First name), Williams (Middle name)

Exact Title Factors Related to Vocational and NonVocational Course Selections of Ninth Grade Students

Degree granted Ed. D., **Date** 1972, **No. of pages in report** 74

Granted by University of Idaho (Name of institution) Moscow, Idaho (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The major purpose of this study was to gather information concerning student attitudes toward industrial educational classes. This was accomplished by surveying a sample of ninth grade male students enrolled in the Spokane Public Schools in the spring of 1971.

The instrument used was a questionnaire consisting of 16 items divided into three areas likely to influence student course selections. These included (1) school, its teachers, counselors, and courses available, (2) family, friends, and other personal influences, and (3) work related factors such as salary, working conditions, and local availability of jobs. The final sample of 128 students was divided into three groups:

1. Inappropriate Nonindustrial Students (INS), those students not enrolled in industrial education classes for grade 10 but who, by accepted guidance standards, should be.
2. Appropriate Industrial Students (AIS), those students appropriately enrolled in industrial education classes for grade 10.
3. Inappropriate Industrial Students (IIS), those students inappropriately enrolled in industrial education classes for grade 10.

The chi square test was used to determine significance among groups. Comparison of means and percentage differences of responses by item and groups were also computed.

The findings include:

1. That significant differences exist between groups when students relate factors concerning the world of work to the selection of industrial education subjects.
2. That no significant differences exist between groups when students relate the selection of school subjects to school and social factors. The one exception among these 10 items was "My family," which indicated differences between groups.
3. That a large portion of the students' responses indicate that the variables listed on the questionnaire had no influence on their selection of an industrial education class (50 percent of all responses).
4. The students who were determined to be making appropriete course selections in terms of their grades, aptitudes, and occupational choice were found to be most positive and consistent in their attitudes toward industrial education classes.
5. That students felt that the school had the lowest effect on their industrial course selections of the three general areas, school, social, and work factors.
6. Over 80 percent of the students felt that their counselors and homeroom teachers had no influence on their selection of industrial education classes.
7. The total number of student responses indicating a favorable influence (as opposed to a negative one) was almost four to one, indicating that the students saw these 16 factors as having a strong positive effect on their course selections.

Certain conclusions were drawn from the data. The information available did not indicate that the groups differed except in the areas relating to work. These work areas allowed the students to relate in a definite personal manner and resulted in responses that reflect individual differences not found in the students' responses to the more general items on the school and personal social factors.

The large number of students, who indicated that the factors listed on the questionnaire had no influence on their subject selections, implied that they find it difficult to relate the choice of industrial education classes to the variables derived from the review of literature.

The students' responses indicate they do not relate occurrences in school with the world of work. Homeroom teachers and counselors had little influence on their choice of industrial education subjects. School and social factors had a similar impact on all groups while there were differences among the groups related to work factors.

It is recommended that the schools increase their efforts to relate the schools to the world of work and that changes in both staff role and curriculum changes are needed to affect this goal. Recommendations for further research include expanding the amount of information available concerning student attitudes toward vocational education and including more information in occupational choice literature at the high school level.

Order No. 72-30,483, 74 pages.

33: 2703-A Dec '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Bettis (Last name), Glenn (First name), Earl (Middle name)

Exact Title A Follow-Up Study of Ph. D. Graduates From The Ohio State University with a Major in Industrial Technology Education

Degree granted Ph. D., **Date** 1973, **No. of pages in report** 242

Granted by The Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The Doctor of Philosophy degree with a major in the area of industrial arts education or industrial technology education has been awarded to persons at The Ohio State University for approximately forty years. During this time, no formal attempt was made to keep track of these persons or to obtain feedback from them.

The purpose of this study was to compile a list of those graduates, determine the types of professional experiences which they have had since graduation, obtain information in regard to their evaluation of the program, solicit suggestions for improving the program, determine what services they feel the University should provide after graduation, and derive and state implications of the evaluative data for program revision. Authoritative answers were sought to eight specific questions.

The study was delimited to those living individuals who received the Doctor of Philosophy degree with a major in industrial arts education from The Ohio State University through the 1971 calendar year.

Literature that dealt with the value of graduate follow-up data was reviewed, as well as literature concerning graduate program evaluation. Follow-up studies previously completed were reviewed, in addition to information concerning survey methodology.

The process of identifying graduates resulted in a list of 104 graduates of which 90 are still living. Data were collected by means of a mailed questionnaire. The data reported in the study are based on information from 88.9 per cent of the living graduates.

Data are reported in tabular and narrative form. Frequencies, percentages and measures of central tendency are used extensively in the presentation of the data.

Among the major findings were: (1) The doctorate was awarded to 2 of the respondents from 1930 through 1939, to 10 from 1940-1949, to 15 in the 1950's, to 34 during the 1960's, and to 19 from 1970 through 1971; (2) Before or during the time graduates were pursuing the doctorate, 8.8 per cent of the respondents had experience in elementary school teaching, 75 per cent had secondary school teaching experience, and 71.3 per cent had experience in college teaching; (3) With the exception of miscellaneous reasons, the greatest reason for respondents selecting The Ohio State University as the school from which to receive their doctorate was available financial assistance; (4) The median number of elapsed quarters while respondents were in the doctoral program was 11.1; (5) The median age of respondents at the time the doctorate was conferred was 34.8; (6) Respondents listed 93 research and development activities that they have participated in since receiving the doctorate; (7) Graduates felt that graduate research associateships contributed more to their professional development than did graduate teaching assistantships; (8) Respondents indicated that the aspect of their doctoral program that contributed most to their professional development was the course work; and (9) The majority of respondents felt that the department should provide some type of formal service to its graduates on a regular basis.

Some of the major conclusions were: (1) The majority of graduates were well pleased with their doctoral program; (2) The majority of graduates become involved in college or university teaching and/or administration; (3) The majority of graduates have had professional writings published since receiving the doctorate; (4) Graduates opposed the idea of eliminating, or replacing with other activities, the general examinations, the dissertation requirement, or the oral dissertation defense; (5) Graduates were dissatisfied with the low number of field experiences or internships available; and (6) Graduates consider membership and activity in professional associations to be important. Order No. 73-26,771, 242 pages.

34: 2358-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Bikkie (Last name), James (First name), Andrew (Middle name)

Exact Title The Meanings of Selected Vocational Education Concepts to Vocational Education Leaders

Degree granted Ph. D., Date 1973, No. of pages in report 454

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose: To measure the connotative meanings of thirty selected vocational education concepts held by a national population of vocational education leaders. Specific purposes were to determine the degree to which vocational leaders agree in their allocation of thirty vocational education concepts in terms of a single factor and of overall factors in the total semantic space, and to compare the reactions of: (1) chief administrative officers, state supervisors, and teacher educators; (2) state supervisors and teacher educators within each of five vocational fields; and (3) leaders from each vocational field with the reactions of leaders from the other vocational fields.

Methods and Sources: The semantic differential developed by Charles E. Osgood et al., was adapted for use in this study. Questionnaires were sent to 494 individuals identified in BAVTE (Office of Education, HEW) directories. A total of 435 (88%) usable responses were received. Appraisal techniques involved: (1) Semantic Differential "D," (2) Pearson product-moment correlation coefficients "r," (3) Osgood's significance criterion for group data, and (4) analysis of variance F-tests (ANOVA).

Summary of Conclusions: (1) The concept Vocational Education was the most dominant descriptor. (2) Evaluative factor data analysis indicated that the attitudes of state supervisors and teacher educators were not mutually supportive. (3) Potency factor data analysis indicated that conceptual congruency was not evident for three concepts: Advisory Committee, Area Vocational Schools, and Teacher Educators. (4) Activity factor data analysis indicated that conceptual congruency was not evident for the two concepts Teacher Educators and Advisory Committee. (5) ANOVA between the three major groups indicated a lack of conceptual congruency for six concepts: Teacher Educators, Minority Groups, State Supervisors, Occupational Mobility, Advisory Committee, and Technical Education.

ANOVA indicated a lack of conceptual congruency between state supervisors and teacher educators in: (1) agricultural education for five concepts State Supervisors, Youth Clubs, Vocational Education, Business Education, and Office Occupations Education; (2) business and office occupations education for three concepts Teacher Educators, Occupational Mobility, and student Motivation; (3) distributive education for four concepts State Supervisors, Teacher Educators, Teacher Qualifications, and Vocational Education; (4) home economics education for three concepts Teacher Educators, Program Evaluation, and Research; and (5) trade and industrial education for seven concepts Teacher Educators, Technical Education, Minority Groups, Program Evaluation, Business Education, Cooperative Education, and Continuing Education.

Summary of Recommendations: (1) The connotative identification of the program-centered concept Vocational Education strongly suggests the retention of this descriptor. (2) Connotative analyses of the meanings of the thirty concepts should be further researched for comparative purposes with: school administrators, teachers, students, and with educationally-oriented groups in the private sector. (3) Concerned vocational education leaders should hold professional meetings for the development of positive role perceptions for those concepts which exhibited significant differences between administrative-supervisory personnel and teacher educators. (4) Longitudinal programs of inservice teacher education should include cooperative planning between administrative-supervisory personnel and teacher educators. Order No. 73-25,584, 454 pages.

34: 2467-A Nov '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Blomgren, Glen, Henry
(Last name) (First name) (Middle name)

Exact Title A Study of Perceived Effectiveness and Importance of Vocational Guidance in High School Industrial Arts

Degree granted Ed. D., Date 1972, No. of pages in report 293

Granted by University of California Los Angeles, California
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to determine the effectiveness and importance of vocational guidance and occupational information provided in high school industrial arts classes. Effectiveness and importance were determined on the basis of stated perceptions of fifty-five male high school graduates who had taken one or more industrial arts classes while in high school, and of thirty-seven high school industrial arts teachers. These perceptions were obtained by means of interviews, and the study was limited to the Fresno City Unified School District, Fresno, California.

Forty statements describing vocational guidance and occupational information were developed for use in the interview questionnaire. Ten statements described occupational information content and were based upon the National Vocational Guidance Association's Guidelines for Preparing and Evaluating Occupational Materials. The remaining thirty statements described actions which might contribute to the student's vocational development, and which were based upon Donald Super's Career Development: Self-Concept Theory. Ten statements described student actions or behaviors, six statements described teacher actions, and fourteen statements described what, for this study, were called student knowledges and beliefs. Respondents were asked to rate each statement on arbitrary five-point scales as to: 1) its effectiveness within industrial arts, and 2) its importance within industrial arts.

Findings of the study included:

1. The vast majority of the students were provided with a number of worthwhile and valuable knowledges and experiences, but vocational guidance was provided for most of the students at far below its potential level.

2. To the extent that the list of statements adequately described a complete package of vocational guidance, overall vocational guidance was more than slightly effective, but not as much as moderately effective. However, the vocational guidance which was perceived to have been provided was well above moderately effective.

3. Vocational guidance in general was perceived to be closer to very important than to moderately important, and even the statements receiving the lowest importance ratings were rated as moderately important. A subsidiary conclusion was that the graduates perceived vocational guidance as more important than the teachers believed they did.

4. Too little occupational information was provided the students in the basic industrial arts classes.

5. Occupational information was, in general, above slightly effective but well below moderately effective. However, the occupational information which was perceived to have been provided was somewhat above moderately effective.

6. Occupational information was perceived to be about midway between moderately important and very important.

Specific recommendations to implement a program of in-service training for industrial arts teachers, to implement a long-range program of vocational guidance development and evaluation, and establishment of an on-going program of occupational information services were presented.

Order No. 72-33,899, 293 pages.

33: 3342-A Jna '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Bonner (Last name), Harold (First name), Scott (Middle name)

Exact Title An Analysis of the Cost-Benefirs for Trainees in a Manpower Project.

Degree granted Ed. D., Date 1972 No. of pages in report 104

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The primary purpose of this study was to determine the ability of the students that attended the Experimental and Demonstration Manpower Program at Prairie View Agricultural and Mechanical College, Prairie View, Texas, to repay the cost expended for their education. As a part of this main purpose, several hypotheses were identified which were designed to improve the techniques of conducting the cost-benefit analysis of the program.

The seven hypotheses which this investigation tested are:

1. Education gained from the manpower program has not removed previous welfare recipients from the welfare rolls.
2. The number of program participants removed from the unemployed ranks is no greater than the number of persons elevated from the under-employed category to that of adequate employment.
3. The program completion rate for persons recruited from the employed ranks is not significantly higher than for those who were unemployed.
4. There is no difference in the program completion rate for males and females.
5. The continued employment rate for the previously employed is no greater than that of the unemployed.
6. The continued employment rate for males and females is not dependent upon sex.
7. The cost of educating the program participants will not be repaid through income tax payments made by these individuals.

To have an adequate sample size, the entire population of the program for the period 1968 through 1970 was selected. Although the project was designed to educate 280 students in nine vocational subjects, two of the instructional areas were discontinued because of a lack of students during the second phase of operation. This reduction in the number of programs reduced the available instructional positions to 240, but only 235 students were enrolled.

Empirical data relative to the established hypotheses were collected on each program participant. The welfare status for members of the group was obtained from area welfare offices. The past work history for members of the group was determined through the use of available records on these individuals. The current work status of the members was determined through personal interviews with unemployed individuals, and with employers and former employers of the trainees. The cost of the program was obtained from available records and budgets that were established for each instructional area.

The Chi-Square Goodness of Fit and Contingency Test were used to analyze hypotheses one through six. The seventh and final hypothesis was analyzed through estimated savings in welfare payments and income tax deductions, which were projected over a thirty-year period.

The principal conclusions were as follows: 1. According to the evidence obtained in this study, preparation under the manpower program at Prairie View Agricultural and Mechanical College is not an effective tool for removing welfare recipients from the welfare rolls. 2. Under-employed persons who participated in the instructional program currently have significantly higher wage earnings than those who were employed. 3. The program completion rate is significantly higher for persons that were previously employed. 4. The continuous employment record is longer for previously employed persons than for those who were unemployed; and for males as opposed to females. 5. Based upon the labor force participation rate of the group, there appears to be limited capability for the participants to repay the cost of their education.

The following suggestions are recommended: 1. That research be done to identify work-incentive programs that will encourage welfare recipients to actively seek full-time employment. 2. That extensive research be accomplished to identify programs that will aid in the prevention of children that currently receive welfare assistance, from becoming future welfare recipients. 3. That job development specialists be assigned to the manpower program staff for the purpose of finding adequate employment and provide counseling for persons prepared in the program. 4. That quality jobs be developed and coordinated at state and local levels, which will provide adequate employment for those persons that receive instructions through manpower programs. Order No. 73-12,308. 104 pages.

33: 6245-A May '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Botsford (Last name), Jon (First name), Frederick (Middle name)

Exact Title A Work Task Inventory and Analysis of Industrial Technology Graduates of Texas A&M University

Degree granted Ed. D., Date 1972, No. of pages in report 175

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Background and Purpose of the Study

The Department of Engineering Technology, Texas A&M University, became aware of a need for documented knowledge of what specific work tasks were being performed by the graduates of the department. This information was needed for two purposes: 1. To be used in counseling and describing to students and potential students the work Industrial Technologists perform on their jobs. 2. The information would be helpful in evaluating and improving the Industrial Technology curriculum. The problem was not unique to Texas A&M. A survey of literature indicated that this was a problem at many schools. A program of a follow-up study of graduates was a frequently recommended method of solving the problem.

The purpose of this study was to ascertain what work tasks the graduates from Texas A&M University's Industrial Technology degree option (also referred to as IT graduates) are doing on their jobs. Specifically, answers to the following questions were sought. 1. With what industry was the graduate associated? 2. What was his salary range? 3. What was his training and education since leaving Texas A&M? 4. What work tasks were performed by the graduate on his present job? 5. How frequently were these jobs performed? 6. What amount of emphasis did the graduates believe should be placed on the various work tasks in the instructional program? 7. What is a typical profile of practicing industrial Technologists at 4 or 5 year increments after graduation? 8. What recommendations may be made for future revision in the Industrial Technology curriculum as based upon the data gathered in 4 through 7 above and analyzing and comparing by observation the courses in the present curriculum against the criteria?

Procedure

A survey by mail was determined to be the most appropriate method of conducting the data gathering for this study. Names and addresses of Industrial Technology graduates of the Department of Engineering Technology were obtained from the Association of Former Students of Texas A&M. A check of official records was used to validate this list of names.

A preliminary form of the survey questionnaire was constructed. A jury of practicing Industrial Technologists was selected and they reviewed the questionnaire for appropriateness and ease of completion. The suggestions of this group were incorporated into the final form of the survey instrument. Copies of the survey form were mailed to 602 graduates of the department. A fifty-two percent return was received.

Conclusions

Within the limitations of the study the following conclusions were made: 1. More graduates of the department were employed by the metal goods industries than any other type of industry. 2. Education after graduation was a common factor among graduates. This education was in several forms: on-the-job training, manufacturers and company short courses, part-time college work, and full time college work. The manufacturers' and the companys' short courses were the most frequent, continuing education media. 3. The graduates experienced good average salary gains. They had an average of five percent gain in salary each year. 4. There was a trend from technical to managerial type of work as time passed since graduation. 5. The most frequently performed work tasks were oriented toward working with or directing people in technical types of work tasks.

Order No. 73-12,309, 175 pages.

33: 6151-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Brill (Last name), Donald (First name), M. (Middle name)

Exact Title A Comparison of Selected Personal and Educational Characteristics of Electronics Technicians and of Students in Electronics Technology Programs in Wisconsin

Degree granted Ph. D., Date 1972, No. of pages in report 368

Granted by The University of Wisconsin (Name of institution) Madison, Wisconsin (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Data were gathered from 124 Electronics Technicians Grade IV, 178 Post-High School Electronics Technology students and from 28 dropouts from Electronics Technology programs to facilitate the comparison of selected personal characteristics among those groups. Statistical analyses were carried out to answer the dissertation question:

> How are selected personal characteristics of students of Electronics Technology programs in Wisconsin Schools of Vocational, Technical and Adult Education similar to those characteristics of practicing Electronics Technicians in industry?

Literature relating to career guidance, personal development, occupational choice and criterion identification was surveyed. Previous research and relevant instruments were analyzed.

Null hypotheses were generated on Socio-Economic Background, Self-Concept of Ability, Job Satisfaction, Curriculum Interests, Job Involvement, Educational, Occupational and Economic Aspiration.

A strong similarity was found between students and technicians with respect to these characteristics resulting in the rejection of most hypotheses indicating a desirable conformity with the success criterion, Electronic and Technicians Grade IV.

Further comparisons were made with the characteristics of dropouts--the criterion of non-success. Four variables were identified which discriminated between the criterion groups: Interest in agriculture, hobby in electronics, attitude toward supervision and attitudes toward work. Positive attitudes identified with these variables were characteristic of students and technicians and uniquely uncharacteristic of the dropouts.

Recommendations for schools included science curriculum review, encouragement of extra-curricular opportunities in electronics, attention to management attitudes, a sound general education component and development of positive work orientation. A negative correlation of Level of Education and attitude toward supervision is presented as a challenge to the school.

Attitude toward supervision among technicians was positively related to the level of educational opportunity offered in plant. Employers were encouraged to emphasize this type of investment in their employees. Attitude toward people was positively related with promotional opportunity as perceived by the technician. While cause and effect in this relationship were not identified, employers were advised to enhance vertical mobility in their plants.

The procedure developed in the study has potential as an evaluation model. Further research is needed to verify the discriminating characteristics identified and to discover others to compose a suitable prediction model for success in Electronics Technology. Order No. 73-2529, 368 pages.

33: 6662-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Browder, Larry, Wayne
(Last name) (First name) (Middle name)

Exact Title Achievement and Interest Levels of 1967-1968 Industrial Arts Curriculum Project Students in 1972

Degree granted Ph. D., Date 1972, No. of pages in report 106

Granted by The Ohio State University Colombus, Ohio
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The basic purpose of this investigation was to determine what effect the experiences in the World of Construction (WOC) course, taken in the seventh grade have had upon the same students surveyed four years later. In order to achieve this purpose, the investigator:

1. Compared the 1968 performance of WOC students on the World of Construction Comprehensive Achievement Examination I with their 1972 performance on the same test.
2. Compared the 1972 performance of 1967-68 WOC students on the CIII instrument with the 1972 performance, on the same instrument, of matched students who took a traditional industrial arts course (TIA) in 1967-68.
3. Compared 1967-68 WOC and TIA students' selection of additional industrial arts courses from 1968 to 1972, and
4. Compared 1967-68 WOC and TIA students' academic performance (grade point averages) in the additional industrial arts courses which they completed between 1968 and 1972.

The following procedures were utilized in this study.

1. The seventh grade 1967-68 WOC and TIA populations were identified in selected Ohio junior high schools.
2. A random sample of 100 students, fifty WOC and fifty TIA, was selected to represent the total 1967-68 populations.
3. All students were oriented to the purpose and utilization of this study.
4. The WOCCAEI and CIII were administered to both groups.
5. The cumulative educational records of all students in both groups were searched in order to determine the number of industrial arts courses which were taken from 1968 to 1972, along with the grades which were earned in these courses.
6. A t-test for related samples and one-way analysis of variance statistical techniques were utilized to analyze the data.

The research design utilized in this study was a modified version of the Campbell and Stanley post-test-only control group design. The fifty-student WOC and TIA groups were randomly selected via a table of random numbers which indiscriminantly identified these representative samples. Comparing students from both innovative and traditional programs within the same junior high schools also assisted in providing a more valid comparative basis for judging WOC student performance.

Two instruments were utilized to assess the achievement and interest levels of the WOC and TIA students in the construction industry. These were the World of Construction Comprehensive Examination I (WOCCAEI) developed in 1967 by the IACP staff and the Construction Industry Interest Inventory (CIII) designed by Ohio State University doctoral student Darius Young in 1968.

The analysis of the data indicated that the WOC students scored significantly higher on the WOCCAEI in 1972 than in 1968 at the .05 level; whereas no significant difference was prevalent between the WOC and TIA groups taking the WOCCAEI in 1972. The WOC students scored significantly higher on the CII instrument in 1972 than did the TIA students. Selection of additional industrial arts courses from 1968 to 1972 was quite similar in both groups, with the WOC students achieving significantly higher grades in these courses.

Recommendations to researchers are: 1. To replicate this study with the IACP World of Manufacturing students. 2. To study the relative performance abilities of IACP and TIA students along a time continuum. 3. To further investigate the cause of equal IACP-TIA WOC achievement test scores, after an extended period of time, since other research has found a significant difference in achievement levels, between these groups, at the time of course completion.

Recommendations to practicing educators are: 1. Desired outcomes in student interests should be developed within the instructional program. 2. Lower level innovative programs should not be resisted simply because of a fear that they will negatively affect subsequent course selections or achievement. 3. Instruction might well emphasize general knowledge, interpretational ability, and applicational ability in order to promote continued educational development beyond specific course completion.

Order No. 73-11,462, 106 pages.

33: 6109-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Brown (Last name), James (First name), Tedford (Middle name)

Exact Title A Comparison of Three Laboratory Instructional Methods Used in an Electronic Test Instruments Course

Degree granted Ed. D., Date 1973, No. of pages in report 128

Granted by University of Arkansas (Name of institution) Fayetteville, Arkansas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Problem

The purpose of this study was to investigate experimentally the effectiveness of three methods of laboratory instructi[illegible]n teaching an electronics test instruments course at the college level. The three experimental treatments were: (1) Traditional (instructor-supervised laboratory), (2) Auto-tutorial #1 (audio-taped procedure accompanied by laboratory equipment), and (3) Auto-tutorial #2 (audio-taped procedures accompanied by slides of performed experiment).

In addition, first-order correlation coefficients were used to identify any significant relationships among eighteen variables. Further analysis of these relationships was conducted using multiple regression techniques in an attempt to develop six regression equations. The variables were: (1) Pre-test, (2) Treatment tests, (3) Preference, (4) Classification, (5) Grade point average, (6) Age, (7) Present course load, and (8) Previous laboratory experience.

Methods and Procedures

This study was limited to thirty students enrolled in electronics technology in the Industrial Education Department, Southwest Missouri State College, Springfield. They were randomly assigned to six different treatment groups. Each group performed experiments which related to three different electronics test instruments--VOM, VTVM, and oscilloscope. The six groups of students received the three experimental treatments according to a repeated-measures, counter-balanced design. Figure 1 gives a pictorial explanation of this randomized design.

	E1	E2	E3
G1	T	A1	A2
G2	A1	T	A2
G3	A2	A1	T
G4	T	A2	A1
G5	A2	T	A1
G6	A1	A2	T

G1 – G6 = Six experimental groups of five students each
E1, E2, E3 = Three equivalent laboratory experiments
T, A1, A2 = Experimental treatments

FIGURE 1

During the initial class sessions, each student completed a personal data sheet and a written multiple-choice pre-test. A written and performance examination was given after each of the three laboratory experiments. The written tests were designed to measure learning which pertained to each experiment. The performance tests were designed to measure the student's skill in properly using the electronics test instruments. Each student was required to perform specific electrical measurements and calculations using the particular test instrument within a prescribed time period. A preference questionnaire was administered to each student at the close of this study.

Analysis of variance for repeated measures was employed to determine any differences in achievement as a result of the treatments. Correlation coefficients were computed between all variables to ascertain the degree of specific relationships. Multiple regression equations for the written and performance tests were developed and analyzed using a step-wise multiple regression technique.

Conclusions

All conclusions are based on the population, treatments, tests, and conditions used in this experiment. The conclusions relevant to this study are as follows: 1. The three treatments are equally effective in teaching achievement and performance skills as measured by written and performance tests. 2. There are no significant relationships between a student's preference of a teaching method and the corresponding measure of achievement associated with that method. 3. Measures of achievement and performance may be predicted from accurate knowledge of two or three correlated variables.

Recommendations

From the findings of this study, these recommendations are the most prominent: 1. The feasibility of using auto-tutorial techniques to teach manipulative skills in other areas of the technologies should be investigated. 2. Research should be conducted to determine if the method of presenting the related theoretical information affects achievement.

Order No. 73-27,367, 128 pages.
34: 2359-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Burroughs, Orval, Neal
(Last name) (First name) (Middle name)

Exact Title A Study of the Evaluation, Development, and Refinement of Criteria for an Advance Vocational Education Program in the Marian Islands of Micronesia

Degree granted Ed. D., Date 1972, No. of pages in report 168

Granted by Texas Tech University Lubbock, Texas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

The investigation posed two main problems:

1. Research failed to discover any criteria for evaluating vocational education programs in emerging societies.

2. Existing Micronesian programs in occupational education had never been evaluated by use of standards.

Purpose of the Study

The purpose of the study was to develop and refine criteria suitable for use in evaluating advanced vocational education programs in the Mariana Islands.

Procedures

The major concern of the study was the development and refinement of criteria for use in evaluating occupational education programs in the Mariana Islands. Since the lines of communication into and within the Trust Territory were not dependable, a Jury of Experts on occupational education was assembled to assist in developing and refining standards for use in the evaluation of Micronesian Occupational Education Programs.

A set of tentative criteria, developed by research of the literature, was sent to the Jury of 20 consultants composed as follows:

1. Deans of Colleges of Education, leading State Universities; (5)
2. Heads of Vocational Education Departments, State Universities and Colleges; (5)
3. Vocational Education Specialists, State Departments of Education; (6) and,
4. Senior Officials, Vocational Education Departments, Federal Agencies. (4)

Packets of background materials were furnished the jurors to assure that definitive criteria would represent the needs of the population served by the vocational education programs being evaluated by use of the standards.

Findings

1. Synthesis of jury critiques achieved standards superior to those which that might have been developed by other means available.
2. Definitive criteria were fashioned to permit quantitative evaluation of individual standard-statements.
3. Results of field tests of tentative criteria made by qualified personnel of the United States Office of Education were considered in definitive standards achieved.
4. Consensus of Jury was that all youth in Micronesia should receive occupational training or be encouraged to complete some study rendering them of definite value to their society.

Conclusions

1. Contributions by jurymen were vital to development of criteria of value to this study and to vocational education programs of Micronesia.
2. All administrative districts of Micronesia except Yap have populations needing specialized courses in Advanced Vocational Education.
3. Distances between islands have resulted in communications so faulty and expensive that all phases of life are impaired: social, educational, political, and economic.

Recommendations

1. The United States Office of Education and the High Commissioner staffs in the Trust Territory should evaluate the findings of this study and make whatever utilization they deem appropriate.
2. Analyses of Population Needs and Job-Market availabilities should be made for each administrative district of Micronesia.
3. Emergency programs for secondary school construction should be initiated to assure availability of space for all eligible students in Micronesia.
4. Land Use Programs should be organized to assure production of foods and other items needed for improved living conditions in Micronesian communities.
5. Studies of ethnic changes within Micronesian societies should be made to determine acculturation developments resulting from wartime traumas, invasions, population migrations, and from changing economic, political, and social conditions.

Order No. 72-32,042, 168 pages.

33: 2828-A Dec '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Burton, John, Robert
(Last name) (First name) (Middle name)

Exact Title Teachers' Attitude Toward Consumer Issues and Their Appraisal of the Educational Relevance of These Issues

Degree granted Ph. D., Date 1970, No. of pages in report 218

Granted by University of Connecticut Storrs, Connecticut
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

PURPOSE OF THE STUDY

The purpose of this study was to find what differences, if any, exist among secondary school teachers of business, home economics, and social studies in regard to their attitudes toward pertinent consumer issues and to find what differences, if any, exist among these three groups of teachers' appraisal of the educational relevance of these same consumer issues.

METHOD OF RESEARCH

A consumer issue questionnaire was developed by the researcher and validated by the executive committee and past presidents of the American Council for Consumer Interests. The questionnaire containing forty-eight consumer issues was sent to a sample of three hundred secondary school teachers chosen by a systematic random sample from lists of business education, home economics, and social studies teachers in Connecticut public schools. Each teacher was asked to rate on a five-point Likert-type scale the strength of his agreement and disagreement with a consumer issue. Each teacher was also to rate on a five-point scale his opinion of the educational relevance of the issue. A seventy-eight percent return was realized. The returns were analyzed by means of *t* and *F* tests and by chi-square tests of independence.

FINDINGS

There existed a significant difference at the .05 level between the attitude mean scores of the social studies teachers and the attitude mean scores of the business education teachers. There also existed a significant difference at the .05 level between the attitude scores of the social studies teachers and those of the home economics teachers. In each case, the social studies teachers were found to be the most consumer oriented. There were no significant differences at the .05 level between the means of teacher group importance scores. No significant differences existed in the variances of the scores. There was a high degree of correlation in both the attitudes towards the issues between the three pairs of teacher groups and in the ratings by the three pairs of teacher groups of the education relevance of the issues.

Two chi-square contingency tables were constructed for each issue listed on the consumer issue questionnaire to determine whether a difference existed between groups on the scoring of the individual items. In the majority of the issues, there was no difference between the teacher groups in attitude rating or in the rating of the educational relevance. When one group of teachers was found to be more consumer oriented in attitude towards an issue, however, it was usually the social studies group. Also, when one teacher group was found to consider a consumer issue more educationally relevant, it was usually the social studies group.

CONCLUSIONS

All three groups of teachers appeared to be consumer-oriented in their attitudes towards consumer issues and the three groups felt that all the issues are at least important enough to be considered for inclusion in the education of a high school student. However, social studies teachers' attitudes towards the selected consumer issues appear to be more closely aligned with the attitudes of consumer advocates than do the teachers of business and the teachers of home economics.

Order No. 71-15,965, 218 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Buxton (Last name), Alan (First name), (Middle name)

Exact Title Lay Advisory Committees and Their Relationship to Occupational Education In the Community Colleges of New Jersey

Degree granted Ed. D., Date 1972, No. of pages in report 187

Granted by New York University (Name of institution) Washington Square, New York (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The Problem

The problem of the study was to analyze lay advisory committees for occupational education in New Jersey community colleges during the college year of 1970-71 with the purposes of ascertaining their structure and organization; identifying their functions; learning the perceptions of faculty community coordinators and lay members as to the frequency of their performance and how well they are achieved; and establishing guidelines for the development, functioning and improvement of such committees.

Methodology

Two questionnaires and a semistructured interview guide were designed for collecting data. A panel of six experts, a pilot study conducted in two community colleges, and a reliability check demonstrated requisite validity and reliability of the instruments.

Responses to the first questionnaire by faculty committee coordinators provided data about the structure and procedures of their advisory committees. Responses to the second questionnaire by both advisory committee lay members and faculty committee coordinators as to functions of committees provided data about their perceptions of: a) how frequently their advisory committees engaged in fourteen listed functions, b) how effectively the fourteen functions were performed.

Following this, two lay members randomly selected from each of the fourteen community colleges that formed the population of the study were interviewed.

The data derived from the questionnaires and the interviews were utilized in the development of guidelines for the formation, development, functioning and improvement of lay advisory committees for occupational curricula in New Jersey community colleges.

Findings

The study revealed that the structure, organization, and procedures of the New Jersey community college advisory committees for occupational education were generally sound, but that a considerable number of committees indicated weaknesses in several important areas.

The lay advisory committee members perceived their committees as engaging in the fourteen functions "occasionally," with an overall mean rating of 2.7 on a rating scale ranging from one to four, where a rating of one was "constantly" and four was "never"; the faculty committee coordinators perceived their committees as engaging more frequently, with an overall mean rating of 2.3, on the same scale.

The lay advisory committee members perceived their committees as performing the fourteen functions "effectively," with an overall mean rating of 2.8 on a rating scale ranging from one to four, where a rating of one was "very effectively" and four was "totally ineffectively"; the faculty committee coordinators perceived their committees as performing more effectively, with an overall mean rating of 2.3, on the same scale.

Generally the faculty committee coordinators perceived their committees as engaging in the fourteen functions more frequently and more effectively than did the lay members.

Guidelines

Guidelines were proposed, based on a comprehensive review of the literature, from conclusions and inferences drawn from the empirical data collected in the study, including interviews, and from the professional experience of the investigator. These guidelines related to the formation and development of advisory committees; selection and appointment of members; cross-sectional, student, graduate, and minority representation in committees; orientation of lay members; size of committees, terms of membership, officers, committee meetings and functions; the meeting agenda, minutes of the meeting, and committee recommendations; recognition of members' services; and evaluation of performance on the basis of committee goals.

Recommendations for Future Study

Recommendations for future research included: 1. Replication of the study in other states and in other geographical areas for the comparison of organizations and functions of occupational advisory committees. 2. Development of a reliable and valid evaluative instrument for self-appraisal of advisory committee performance on the basis of achievement of stated goals. 3. A test of the hypothesis that the more effective the system of advisory committees in a given system of community colleges, the better the occupational programs.

Order No. 73-8202, 187 pages.

33: 5622-A April '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Calder (Last name), Clarence (First name), Roy, Jr. (Middle name)

Exact Title A Comparison of the Relative Effectiveness of Four Methods of Teaching Manipulative Activities

Degree granted Ph. D., Date 1964, No. of pages in report 248

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to compare the effectiveness of four selected instructional treatments measured by judges' ratings of subjects' performance on four selected manipulative tasks. The study focused on comparing self-instruction, lecture-demonstration (classroom), lecture-demonstration (television), and no-instruction methods of teaching manipulative activities.

The major hypotheses to be tested were:

1. There are no differences in times required to perform manipulative tasks taught by self-instruction, lecture-demonstration (classroom), lecture-demonstration (television), and no-instruction methods of teaching manipulative activities.
2. There are no differences in quality of performance of groups taught by these four instructional treatments.

Research Design and Treatment of Data

A four-by-four counterbalanced Latin square design was employed. The rationale for the Latin square was to control some of the variables and criticisms of classroom experimentation. Groups, teachers, tasks, and treatments were randomly assigned.

Four groups of subjects were selected from a population of college juniors and seniors. These subjects were enrolled in education courses at the University of Connecticut.

Sketching, Desk Blotter Construction, Block Printing, and Solid Block Construction constituted the four manipulative activities selected to serve as the learning-performance tasks. The tasks were relatively unrelated in the tools, materials, and processes required to perform each task.

Subjects were required to perform the assigned manipulative tasks taught by one of four instructional treatments. Subjects taught by self-instruction and no-instruction were given no verbal procedural instructions. The self-instruction treatment group was given written procedural steps, while the no-instruction group learned by a trial and error procedure. The lecture-demonstration groups received twenty to twenty-five minutes of verbal and illustrated instructions. Teachers were not allowed to assist subjects or answer questions during subjects' performance on the tasks.

Four teachers were selected from students enrolled in the School of Education. Teachers were trained to perform those tasks which they were required to demonstrate. Training varied with treatment and complexities of the tasks.

Four score cards were developed to enable the judges to evaluate the quality of performance on the assigned tasks. Scoring was accomplished by three judges who circled the appropriate ratings on the cards, which listed specific criteria for evaluation.

The statistical tests were: Kendall's Coefficient of Concordance, for agreement among judges; Analysis of Variance, for a Latin square design, to determine differences in performance time and quality of performance; t-test between column means, to isolate differences between treatments; Duncan's Multiple Range Test between row means, to isolate differences between treatments; Friedman's Two-way Analysis of Variance, to determine if a ranking of treatments existed.

Results

Hypothesis 1 was accepted because the F value was not significant at the .01 level.

Hypothesis 2 was rejected because the F value was significant at the .01 level.

Conclusions

1. Ranking of Instructional Treatments: Quality of Performance
   a. Self-instruction ranked first
   b. Lecture-demonstration (classroom) ranked second
   c. Lecture-demonstration (television) ranked third
   d. No-instruction ranked fourth
2. Instructional Treatments: Time
   Time was not a causal factor in the differences that resulted among instructional treatments.
3. Subjects required to perform manipulative tasks without verbal and written instructions, did perform the task, but with many errors in the organization of materials and in the procedural steps used.

Microfilm $3.20; Xerography $11.25. 248 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Calero (Last name), Thomas (First name), Manuel (Middle name)

Exact Title Technology and the Changing Circumstances of Managerial Careers.

Degree granted Ph. D., Date 1972, No. of pages in report 216

Granted by Northwestern University (Name of institution) Evanston, Illinois (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The research problem was to develop a better understanding of the impact technological change has upon the job responsibilities and actual job activities of managers and technical support personnel in several midwestern corporations. The study aimed to identify change effects traceable to technology as well as effects having no necessary or convincing connection with technological change.

Four corporations were chosen: two exhibited the characteristics of "high level" technology in current engineering terms; one was classified "intermediate"; and the fourth "low level," technologically. It was expected that deliberate choice of distinct technological types would produce illuminating contrasts in technology's impact upon managerial and technical personnel.

Detailed interview information was collected from 151 respondents representing all managerial authority levels and all managerial authority levels and all major organizational functions. These data were supplemented by personnel statistics, organization charts, position descriptions and related records.

Analysis identified a marked trend toward reevaluation of on-the-job experience vis-à-vis formal education with respect to "getting ahead in management." Corporate decision makers have created a personnel policy environment in which educational credentials have gained significantly at the expense of sheer job experience in the making of promotions to and within management echelons.

A technological rationale was frequently used to justify the greater emphasis upon (especially technical) education. An equation was drawn between the growing complexity and "sophistication" of production and information technologies and an asserted need for technical degree holders in both operating manager and support specialist roles.

Findings document the buildup of "talent pools" within technical support groups and it is increasingly frequent that promotional movement is from these support groups into operating manager positions. Meanwhile, traditional, vertical movement up within line functions (consonant with the concept of "promotion from within") is waning.

A gain in formal authority on the part of technical support groups has accompanied their emergence and growth. A technological rationale is again invoked to explain support group growth and authority shifts. As technological change progresses, more and more technically educated people are seen as needed for the "fine tuning" of organizational resource allocations and production processes. Increasingly, formal delegation of coordination and control functions is made to technical specialists.

A "credentials barrier" now faces large numbers of potential and actual lower level managers without college degrees. Non-degree holders tend to be "frozen" in place, with slim prospects for career improvement. Meanwhile the velocity of vertical and lateral job changes for college graduate members of management is highly visible. A net effect: stability below and mobility above in these management structures.

Evidence relative to so-called "managerial obsolescence" proved highly ambiguous. Respondents spoke in varied and conflicting ways about the realities, magnitudes, loci and causes of obsolescence. A slight tendency was found to view "others" as more subject to obsolescence than oneself, and to see technical specialists as more endangered than operating managers.

Each firm was experiencing various rates and magnitudes of change in organization structure, organizational relations, formal objectives and manpower "mix." However, managerial initiation and guidance of change processes was notably unsystematic. Often change "just happened." Change initiators did not typically apply the planning, organizing and control talents routinely drawn upon in their work to the management of change processes themselves. Implications of these findings for the change management facets of managerial roles were explored.

Order No. 73-10,200, 216 pages.

33: 5833-A April '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Carreras, Emanuel, ________
(Last name) (First name) (Middle name)

Exact Title The Product of Area Vocational Centers in the State of Michigan

Degree granted Ph. D., Date 1972, No. of pages in report 233

Granted by The University of Michigan, Ann Arbor, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

THE PROBLEM

The purpose of this study was three-fold: (1) to describe the employment experiences and opinions of high school graduates who received training in area vocational centers, (2) to examine whether there are differences among the five area centers with respect to their graduates' employment experiences and opinions, and (3) to determine whether area center graduates' employment experiences and opinions differ from two comparison groups: graduates who received vocational training in comprehensive high schools and graduates who followed academic programs in comprehensive high schools.

PROCEDURES

One thousand three hundred and eighty-eight high school graduates received training in five area vocational centers during the school year 1970-71. From this population, a stratified random sample of 555 graduates were mailed questionnaires, resulting in 449 questionnaires (80.9 percent) returned. The comparison sample included 25 college prep/general and 25 vocational/coop high school graduates from two different high schools which also had graduates trained in the same area center (female, majority of sample).

FINDINGS

Analysis of the data indicate that 348 graduates (97.5 percent) were successful in their search for employment, including 179 (51.4 percent) who were employed in the same trade or one related to their training. The data indicated that: (1) the majority of graduates (70.9 percent) were satisfied with their first job, (2) 92.6 percent rated the quality of vocational training received from "good" to "excellent," and (3) 98.2 percent recommended the area vocational centers to other students seeking occupational training.

Although differences in employment experiences for the three groups were not statistically significant, the differences consistently favored the vocational graduates as compared to their academic counterparts in every measure tested. When considering school related factors, the area center and vocational/coop graduates were much more positive about their schools, programs, and related services than the academic graduates. For example, the area center and vocational/coop graduates (100 percent) indicated that they would recommend the program they had followed to other high school students seeking similar training as compared to 48 percent of the academic graduates.

Statistical analysis of the data also support the rejection of certain measures within hypotheses tested. Sixteen of the twenty-nine items measured for area center graduates and ten of the twenty-five items measured within the comparison sample were rejected were statistically significant at the one percent level of confidence. The failure of the other combined total of twenty-eight measures to reach the five percent level of confidence indicates that the differences concerning the graduates of the five area centers, and those graduates within the comparison sample were not great enough to be considered statistically significant.

CONCLUSIONS

It is concluded that the area vocational centers have been successful in preparing high school students for the world of work. The differences between the centers can be attributed, at least in part, to the degree of individual area center development of programs and related services, and also to the availability of employment in the different communities.

The findings of this study support the concept and continued development of the area vocational centers in the State of Michigan as an integral part of a comprehensive system of secondary education. It is concluded also, based on the comparable employment success of the vocational/coop graduates, that the vocational/coop program should be developed further since it has the potential of serving a greater number of students by using the total community as the vocational training laboratory.

Order No. 72-19,011, 233 pages.

33: 2249-A Nov '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Carter (Last name), Virgil (First name), Lee (Middle name)

Exact Title Status of the Industrial Arts Programs in the State of Oklahoma in 1971-72 with Recommendations for Improvements

Degree granted Ed. D., **Date** 1973, **No. of pages in report** 113

Granted by University of Arkansas (Name of institution) Fayetteville, Arkansas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study has been four-fold: (1) Rate as to their importance twenty-five objectives which support new advancements in industrial arts programs in the United States; (2) Determine the status of industrial arts in Oklahoma; (3) Evaluate the industrial arts programs in Oklahoma based on criteria selected and subsequently chosen by industrial arts teacher-educators, supervisors, and teachers; and (4) Recommendations for improvement of industrial arts programs in Oklahoma.

CONCLUSIONS

1. Most teachers of industrial arts in Oklahoma had adequate professional preparation for teaching in that field.
2. A majority of industrial arts teachers received their college preparation in the state of Oklahoma. This was true for both graduate and undergraduate preparation.
3. Drafting was the most popular course from the standpoint of student enrollment in a majority of all the programs studied. Woodworking and general shop were ranked next, in that order, from all the industrial arts courses offered.
4. There was evidence of a low membership in the industrial arts teachers' own state organization (OIAA).
5. There were deficiencies observed in the visits to schools in the following areas: Laboratories, class loads and management of supplies.
6. There was evidence of a lack of agreement among teachers studied in regard to goals and objectives of their overall programs.
7. There was evidence of a lack of communication between the state and local programs, as well as among the local programs themselves.

RECOMMENDATIONS

1. Supervisors, teacher-educators, and industrial arts teachers in Oklahoma should use the following objectives as criteria in curriculum development of an industrial arts program:

   Develop in each student skill in the safe use of tools and machines.

   Develop an ability to use tools, materials and processes to solve technical problems.

   Facilitate communication and cooperation among individuals while completing class assignments.

   Assist the student in developing an awareness of design to meet a specific need.

   Develop in each student an insight and understanding of industry and its place in our society.

   Discover and develop student's talents in industrial and technical fields.

   Develop an understanding of requirements, opportunities, and working conditions in technical and industrial fields.

2. Major emphasis be placed upon study and implementation of current objectives in the industrial arts program of Oklahoma.
3. Colleges place more emphasis on objectives to be implemented into a revised industrial arts curriculum.
4. Inservice training be provided for industrial arts teachers now working in that field and who have had no previous professional training in working with objectives so that all programs throughout the state would be working toward the same contemporary goals and objectives.
5. Industrial arts teachers should participate in activities contributing to their professional growth in at least four areas. These are: (1) Continuation of study to keep up with newer concepts of teaching; (2) Participating in state and local organizations; (3) Reading more professional literature; and (4) Participation in workshops pertaining to industry.
6. Monthly industrial arts news letter be published by the state supervisor of industrial arts or the state association in order to provide closer communication between state and local programs.
7. Teachers use the American Industry Project approach or one of the other studies of industry approaches in the related literature as a vehicle of learning rather than the individual project which has been traditional.

IMPLICATIONS

1. State Supervisor should spend more time with local teachers and supervisors in coordinating and implementing changes in the industrial arts programs to meet the needs of students in keeping with modern methods and philosophy of industrial arts.
2. Workshops on modern objectives and methods should be encouraged by the State Supervisor and implemented by teacher education institutions.
3. Teacher education institutions should implement changes in their program so that graduates will feel comfortable and knowledgeable about the use of corporate construction and manufacturing as a vehicle of learning about industry.

Order No. 73-27,407, 113 pages.

34: 2468-A Nov '73

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Cerny (Last name), Joseph (First name), Kenneth (Middle name)

Exact Title Implications for the Development of a Community College Vocational Education Program Based upon the Commonalties of Content of Selected Product Servicing Occupations.

Degree granted Ed. D., Date 1972 No. of pages in report 204

Granted by Wayne State University (Name of institution) Detroit, Michigan (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Problem

The purpose of the study was to develop a community college vocational education program based on the commonalties of content of three dissimilar product-servicing occupations.

Procedure

The study was framed in the theoretical construct of the Functions of Industry, "Service Activity."[1] This construct suggested that the service of a malfunction of a product of industry could be divided into the functions of diagnosis, correction (adjustment, repair, replacement), and testing. The construct also suggested that a knowledge base could be identified within the service activity.

Supplemental to the primary purpose of the study, the proposed community college vocational program took advantage of the concepts of vocational behavior and vocational development. That is, within the developmental task concept, the place for a vocational program in the maturation process of an individual was between the ages of nineteen and twenty-one. This age group readily identified with post-high school or community college students.

Four major steps were executed in the study. The first step was the selection of three product-servicing occupations which could be classified dissimilar. The three occupations meeting design criteria were the automotive mechanic entry, the electronic mechanic entry, and the refrigeration mechanic entry. The second major step in the study was the determination of the job tasks required at entry level for each occupation identified. The third major step dealt with the determination of the related technical information basic to the identified entry level job tasks. The final step dealt with the synthesizing of the dissimilar occupational area related technical information lists into one listing for the determination of commonalties of content. From this listing came the content which held the implications for the development of a community college vocational program.

Findings

The data indicated an insufficient overlap of items of related technical information across the three identified occupational areas. The data indicated that related technical information expressed in the terminology of each occupation under study were too specific to determine commonalities for the development of a community college vocational program.

Conclusions and Recommendations

The data strongly suggests that commonalties may exist within the three dissimilar occupations. However, one must move from the specific to the general, that is from a job task-related technical information base to a general technical base. This general technical base expressed in the form of scientific principles and concepts would have application across the identified product-servicing occupations.

Commonalties exist on a broad base in the natural and physical principles and concepts of hydraulic, electrical, fluidic, mechanical and chemical areas.

The vocational guidance component, identified in the study, may well be best served by a pre-technical program encompassing scientific principles and concepts. If a student were introduced to each of the concept areas through examples within each of the dissimilar occupations, he would be exposed to the natural and physical laws with applications underlying a large number of occupations. A broad base of scientific principles and concepts underlying a large number of product-servicing occupations will better equip the student for initial occupational choice and subsequent occupational change.

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[1] Willard M. Bateson and Jacob Stern, "The Functions of Industry As The Basic For Industrial Education Programs," Journal of Industrial Teacher Education, Vol. I, No. 1, (Fall, 1963), 3-16.

Order No. 73-12,489, 204 pages.
33: 6246-A May'73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Chapman (Last name), George (First name), Lincoln (Middle name)

Exact Title Psychometric Prediction of Engineering Student Persistence

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 189

Granted by The University of Michigan (Name of institution) Ann Arbor, Michigan (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Schools of engineering traditionally rely primarily on measures of academic ability for selection from the total group of applicants of students who should complete the graduation requirements successfully. The results from this procedure are somewhat unsatisfactory as evidenced by typical attrition rates of 40 to 50 percent between entrance and graduation. The objective of this study was to develop a psychological test to predict the persistence of academically qualified applicants as students of engineering.

Focus of the study was on a personality concept termed impulsivity which had previously been demonstrated to be significantly related to the persistence of engineering students. Two measurement scales designed to indicate the degree of general impulsivity of each subject were incorporated with a scale designed to measure the degree of certain dispositional traits or preferences (predisposition) related to the engineering student role requirements. In addition, a separate instrument composed of a group of items involving an engineering-oriented task which required choices from a multiplicity of alternative responses was developed. The purpose was to provide an indication of a subject's impulsiveness in performing a task related to the specialized area of the study of engineering.

Both instruments were administered to about 600 fall 1970 entering freshmen at General Motors Institute, a large private engineering school. A followup survey intended to measure the degree of commitment to the role of engineering student was administered to those participants who returned for their sophomore year. Exit data obtained for those who withdrew consisted of the major causal factor expressed and the time accruing before withdrawal. The reasons for attrition expressed by 87.7 percent of those withdrawing were either academic difficulties or dissatisfaction with the study of engineering. The small number of other causes expressed and the lack of significant relationships to the length of time accruing before withdrawal and to the measured degree of role commitment resulted in no further consideration of these areas.

The two general impulsivity measuring scales performed as expected in group differentiation when comparing the highest-scoring (more impulsive) one-third of the subjects with the lowest-scoring (less impulsive) one-third. The overall first-year withdrawal rates for the groups determined on this basis were 23.0 versus 16.0 percent for one scale and 22.9 versus 13.7 percent for the other. Results for the engineering "predisposition" scale were 23.2 percent withdrawals for the low-scoring third compared to 14.9 percent for the high-scoring third. The overall relationship to attrition was highest for the latter scale and it was shown that, if used as the sole addition to the traditional selection procedures, it would make possible a 9.8 percent reduction in attrition.

The engineering-oriented task test resulted in relatively independent time and error scales, none of which correlated highly with persistence when considered on an independent basis. However a scattergram based on errors versus time produced a group of 85 at one extreme from which 24.7 percent withdrew versus 12.6 percent withdrawals from a group of 87 at the other extreme. Using this test as a selection device thus appears to have considerable merit although only a 3.3 percent decrease in attrition would have resulted from adding this test alone to the traditional selection procedure. Suggestions are included for changes in this test which should result in increased performance capabilities.

Various combinations of the measurement scales, including multiple regression formulas, did not provide extensive increases in predictability. Although excellent group distinctions were obtained, the maximum accuracy achieved in the prediction of individual performance was around 40 percent. Suggestions for improvements aimed at raising this to a higher level are included.

Order No. 72-29,015, 189 pages.

33: 2097-A Nov. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Chastain, Gary, Kent
(Last name) (First name) (Middle name)

Exact Title Effects of Visual and Verbal Presentations Upon the Performance of a Psychomotor Task

Degree granted Ed. D., Date 1972, No. of pages in report 133

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this investigation was to ascertain the relative effects of pictorial, pictorial and auditory-verbal, pictorial and visual-verbal, or pictorial, auditory-verbal and visual-verbal presentations upon (1) the learning of a psychomotor task by high and low mental ability groups, and (2) the amount of time these groups would take to complete the task.

The population for this study consisted of one hundred and seven seventh grade students of which eighty students were randomly selected from the upper and lower forty per cent of the I. Q. score range. This investigation was conducted as a 2 x 4 factorial design using a posttest-only control group experimental design. The independent variables were (1) method of stimulus presentation, (2) mental ability levels, and (3) finger dexterity. The dependent variables were performance scores on a psychomotor task and the amount of time needed to complete the psychomotor task.

An electrical assembly task was selected for this investigation because it is commonly used in industrial arts courses. More specifically, the task utilized in the study was the assembly of a series-parallel electrical circuit.

An analysis of the task was performed to identify the step-by-step procedure to be followed in the assembly of the electrical circuit. From this analysis a script was prepared that illustrated the performance of the task and a series of sixty-four 2 x 2 slides were produced. These slides were duplicated, and printed captions were added to the duplicate slides. An audio tape recording was made by reading the captions while viewing the slides. The audio tape recording and slides were synchronized for treatments with auditory presentations.

Each treatment presentation was given to ten subjects simultaneously. At the end of the presentation the subjects assembled the electrical circuit and were administered a finger dexterity test. The times taken to complete the task were recorded and the completed electrical circuits were evaluated for accuracy.

The finger dexterity test scores were analyzed to ascertain the relationship between finger dexterity and the completed psychomotor task, and finger dexterity and the amount of time needed to complete the task. The correlation coefficients for the above relationships were very low.

A two-way analysis of variance was computed for the psychomotor task scores and times needed to complete the psychomotor task. The analysis failed to reveal a significant difference among treatments for the completed psychomotor task score and the amount of time needed to complete the task. Also, there was no significant difference found between mental ability levels for the amount of time needed to complete the psychomotor task. The analysis did reveal a significant difference between mental ability levels on the completed psychomotor task scores irrespective of the treatment experienced.

The following conclusions may be drawn relative to manipulative tasks of similar complexity to the one used in this investigation.

In view of the finding of no difference among the mean performance scores for the completed psychomotor task for different methods of stimulus presentation, it can be concluded that no difference in the amount of interference should be anticipated between the combined channels of communication when the material presented in each channel is redundant. Educators can expect high mental ability students to assemble similar electrical circuits more accurately than low mental ability students. Order No. 73-7018, 133 pages.

(33: 4905-A) March '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Cheek (Last name), Gerald (First name), Don (Middle name)

Exact Title The Effectiveness of Teachers in Area Vocational-Technical Schools of Kansas and Their Attitudes Toward the Disadvantaged

Degree granted Ph. D., Date 1972, No. of pages in report 207

Granted by Kansas State University (Name of institution) Manhattan, Kansas (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to ascertain whether teachers in area vocational-technical schools of Kansas who are judged most effective by their supervisors express attitudes which are more favorable toward disadvantaged students than do their colleagues who are judged least effective.

Hypotheses

The following null hypotheses were set forth as major expectances: (1) There is no differences in the background of the instructors (twelve variables). (2) There is no differences in the opinions and attitudes toward the disadvantaged (fourteen categories). (3) There is no differences in the evaluation of instructors of the area schools. (4) There is no difference in the attitudes of instructors rated most effective and those rated least effective. (5) There is no difference in the attitudes of instructors and evaluators. (6) There is no difference in instructors' attitudes of rural and urban area schools. (7) There is no correlation between attitudes, backgrounds, and evaluations of teacher effectiveness. (8) Instructors expressed comments are independent of attitude scores and teacher evaluations.

Procedure

Data was collected from 422 instructors and 39 evaluators on a 106 item revised Faunce C.D. questionnaire, and a background questionnaire. An evaluation of each instructor was made by their supervisors, directors, and principals of fifteen different area vocational-technical schools.

Data were subjected to analysis of variance with Scheffe multiple comparisons, t-test of two independent samples, chi-square of independence and analysis of regression.

Findings and Conclusions

1. Significant differences were found in the instructors' background on the items of age, teaching experience, non-educational work experience and educational level. Differences also existed between schools in the evaluation of teacher effectiveness on all eight items used to rate them. There were no significant differences in total attitude scores of teachers toward disadvantaged students, but significant differences were found on categories of delinquent behavior, teaching methods and motivating, physical surroundings and the culture of the disadvantaged.
2. Teachers rated most effective do not have different attitudes toward disadvantaged students than those rated least effective. There were no significant differences found between the attitudes of rural and urban area vocational school instructors.
3. A positive and knowledgeable comment made by an instructor was found to be dependent on a high attitude score.
4. A significant correlation coefficient was found between women and total attitude score.
5. Instructors have less positive and knowledgeable opinions and attitudes toward the disadvantaged than those who evaluate them.

Recommendations

A search should be made for more sensitive instruments to measure attitudes toward the disadvantaged. New ways are needed to change negative opinions and beliefs toward disadvantaged students.

Methods must be found to recognize those who will and will not be successful teaching the disadvantaged and be placed accordingly. Order No. 73-1158, 207 pages.

33: 3491-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Cherry (Last name), Roger (First name), Ward (Middle name)

Exact Title A Comparison of the Technical Knowledge Required for Job Entry into the Lithographic Industry With the Knowledge Taught by Selected Schools of Printing in the State of Michigan

Degree granted Ed. D., Date 1972 No. of pages in report 191

Granted by Wayne State University (Name of institution) Detroit, Michigan (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Problem

The objective of the study was to compare the opinions of lithographers and printing teachers with respect to job entry skills required of a beginning worker in the field of lithography. In addition, the study identified which of these skills were actually being taught in the schools. Another aspect of the study was to identify and compare the personality traits which union and non-union segments of the lithographic industry felt were desirable for job entry.

Procedure

In order to meet the objectives of the study, eight major steps were followed: (1) identification of major tasks, subtasks and associated technical information for the occupations selected; (2) identification of personality traits to be used in the study; (3) selection of juries from industry to be used in validation process; (4) development of the survey instruments to be used in the study; (5) validation of the major tasks; subtasks and associated technical information and ranking of personality traits; (6) tabulation of jury responses; (7) identification of educators to be used in the study and the distribution of validated material; and (8) reporting the opinions of educators with respect to the previously identified major tasks. From the above came the data on which the following conclusions and recommendations are based.

Conclusions and Recommendations

From the data gathered in the study of the four lithographic occupations – reproduction cameraman, stripper, platemaker, and offset pressman – the following conclusions were drawn and recommendations made:

The lithographic industry and teachers of selected community college printing programs in the State of Michigan are in accord to a high degree on the knowledge needed by a potential employee at the time of job entry. These teachers not only agreed, but are teaching 94.5 per cent of the major tasks identified as being desirable for job entry by the lithographic industry.

The data indicates both union and non-union segments of the industry are in agreement as to which skills are needed by potential employees at the time of job entry. Both groups also agreed to a large extent, as to which personality traits are most important to possess, in order to find success as employees in the lithographic industry.

Education must continue to meet the needs of industry, the educator must continually alter his program to meet these needs. As industry changes or develops new techniques, the educator must do the same. There must be more meaningful communication between the lithographic industry and the educator. This can be accomplished by: (1) meaningful advisory committees; (2) state or industry sponsored inservice training programs; (3) creation of specific programs which would allow teachers to work in industry periodically to upgrade their technical skills; and (4) additional state and federal funds to purchase the equipment and supplies needed by educators if they are to train students in the skill areas needed by the ever expanding lithographic industry.

Order No. 73-12,492, 191 pages.

33: 6246-A May'73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Christensen, James, Edward
(Last name) (First name) (Middle name)

Exact Title Occupational Education in Zambia: Obstacles to the Development of Technical and Vocational Education Programs in Zambia, 1885-1970

Degree granted Ph. D., Date 1972, No. of pages in report 189

Granted by University of California Los Angeles, California
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The study is a historical analysis of the factors which have impeded the development and expansion of formal occupational education in Zambia during the period from 1885 through 1970. The central question which this study focused upon was why technical and vocational education programs had not developed to the extent that one might have expected, especially given the factors of untapped natural resources, the support of the British colonial authorities for occupational education, and the post-independence drive for economic growth and technological improvement.

The study found that the shortcomings of occupational training programs which were developed during the colonial administration were inherent to the colonial situation. That is to say, the deficiencies resulted from an interaction of political and socio-economic forces which alien rule made possible. Pursuing policies which they perceived to best serve the interests of the Africans, the colonial authorities concentrated upon developing a comprehensive African primary school system and all but neglected the development of a secondary school system. Moreover, the colonial government prescribed a "practical" curriculum which emphasized handicrafts and agriculture. The colonial authorities' emphasis upon mass education to almost the exclusion of secondary and higher educational opportunities only served to aggravate the popular demand among Africans for a secondary educational experience identical to the Europeans'. Africans came to regard the emphasis on practical subjects to African schools as a ploy to keep Africans in the disadvantaged status of unskilled manual laborers. A dawning suspicion ultimately grew into adamant conviction among Africans that any form of education which differed from the schooling which the Europeans provided for their own children was inferior education meant to perpetuate a master-servant relationship. Thus, it came to be that the British secondary grammar school was the educational institution to which African aspirations became riveted.

The European community in Northern Rhodesia found it in their self interest to support the concept, formulated and rationalized as it was by governmental and philanthropic organizations, that African society should proceed on a separate, but parallel course of development, until cultural evolution brought black society to an equivalent level with white culture. The more aspiring and ambitious Africans recognized the fallacy of this rationalization which served to justify white domination and white racism. They further recognized that they would ultimately have to wrest political and economic control from the white minority so that they could organize and direct the country's resources and energies towards serving the interests of the majority.

When political independence was achieved in 1964, occupational education tended to get lost in the shuffle. One of the political imperatives of the early years of independence was to expand general education at both the primary and secondary levels. On the other hand, a popular mandate for occupational programs, other than teacher training, did not really exist. Moreover, the generally low educational attainment of Zambian society probably could not have sustained advanced or even middle-level occupational training, at the moment of independence.

The policies which guided occupational training during the first few years of independence were characterized by short-sighted decisions and wishful thinking. An assessment of the condition of occupational training programs in 1967 revealed that the colonial legacy continued to cripple the development of occupational education. Remnants of racial discrimination, unhappy memories associated with trades training institutions, and disconnected effort had interacted to stall plans for expansion of occupational training. Acting upon recommendations that occupational education would have to undergo a total reorganization, President Kaunda created (1967) a new Commission for Technical Education and Vocational Training to preside over occupational education programs.

After nearly two years of organizational work and curriculum planning, the Commission publicly outlined (1969) its strategy for making occupational education a vital and productive process in Zambia. The most substantial and far-reaching reform proposed by the Commission was the elevation of occupational training to post-secondary level. Occupational education was to be removed from the status of being merely another route to the general secondary school diploma (the Cambridge Overseas School Certificate).

By 1970, one of the major deterrents to an effective occupational training program in Zambia (i.e., inadequate political organization) had been removed. A central organization had been born, and it had the authority to coordinate and to direct both governmental and private efforts in occupational training. Moreover, it was closely associated with the President's Office so that it could effectively compete for funds with the other agencies of government. The Commission held much promise for future development of technical and vocational programs.

However, along with the promise of new leadership, many doubts and unsolved problems remained. Those problems included: (1) the uncertain source of supply of qualified teachers, (2) the degree of coordination possible between training and employment, (3) the maintenance of adequate funding over a long period of time, and (4) the coordination of occupational training with manpower planning. The unfolding of events in the seventies would reveal whether the new Commission was up to the task of resolving these problems. Order No. 73-10,413, 189 pages.

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33: 5527-A April '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author CHRISTISON, Chester, Earl
(Last name) (First name) (Middle name)

Exact Title Elements of American Industry Taught in Elementary Schools

Degree granted Ed.D., Date 1973 No. of pages in report 215

Granted by University of Northern Colorado, Greeley, Colorado 80631
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of Study:
The purpose of this study was an attempt to determine what the Fresno County sixth grade elementary students, social studies teachers and general elementary teachers knew about American industry and the environmental concepts directly related to it.

Source of data and method of study:

Multiple-choice tests containing four identical and twenty dissimilar questions were administered to sixth grade students and their instructors to determine their knowledge about American industry and the environmental concepts directly related to it.

Findings and Conclusions:

The mean and percentage scores and a factor analysis for the students, general elementary teachers, and social studies teachers were computed. The result was compared to the assumption that a 70 percent score for students, an 80 percent score for general elementary teachers and a 90 percent score for social studies teachers would be an acceptable knowledge of industry score.

The following results were obtained:

1. It was determined that neither the students nor the social studies teachers have an acceptable knowledge of industry.
2. It was determined that neither the students nor the social studies teachers have an acceptable knowledge of environmental concepts.
3. Both students and teachers have need for concepts of industry and environmental concepts of industry to be included in their curriculum.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Chumbley (Last name), John (First name), Dale (Middle name)

Exact Title A Cost Analysis of Selected Vocational and Technical Education Programs in Oklahoma

Degree granted Ed. D., Date 1972, No. of pages in report 134

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

SCOPE AND METHOD OF STUDY: The main objectives of this study were (1) to develop a cost procedure that could be applied to cost information received from Oklahoma's public schools to compute the average annual operating cost of selected vocational and technical education programs in Oklahoma; (2) to develop and validate a method for determining each cost item used in the procedure; (3) to establish and validate cost for each vocational and technical program selected.

The cost information in the study was obtained from a majority of the public schools in Oklahoma which have vocational and technical education programs. The cost procedure shown in the study was applied to the cost information received from the schools to determine the average annual operating cost of selected vocational and technical education programs in Oklahoma. A separate cost was computed for the high school, area school, and junior college programs.

After the average annual operating cost was computed for each vocational and technical education program investigated, a panel of Oklahoma public school administrators critiqued the findings of the study. The panel consisted of two high school, two area school, and two junior college administrators. The selection of the administrators was based upon their knowledge of vocational and technical education program costs.

FINDINGS AND CONCLUSIONS: The panel of public school administrators who reviewed the findings of the study felt the average annual operating costs were representative of the average cost of programs and would serve as a guideline for the cost of vocational and technical education programs in Oklahoma.

The procedure for determining the average annual operating cost of vocational and technical education programs presented in the study can be used to determine the annual operating costs of any type of educational program in any state or country.

The cost information is an initial effort in providing annual costs of programs for Oklahoma that can be used by school administrators and the educational community as a general guideline to (1) plan for future vocational and technical education programs; (2) assess the results of ongoing vocational and technical education programs; and (3) decide among alternative vocational and technical education programs.

Order No. 73-15,073, 134 pages.

33: 6582-A June 73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Clark (Last name), Charles (First name), G. (Middle name)

Exact Title An Assessment of Selected Variables in the Selection of Students for Secondary Area Vocational Programs

Degree granted Ph. D., Date 1972, No. of pages in report 140

Granted by Michigan State University (Name of institution) East Lansing, Michigan (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to improve the process of selecting students for participation in secondary area vocational programs through the identification of predictive variables.

The need for the study was emphasized by pointing out the increasing pressures on public education to play a viable role in manpower development. Occupational preparation options are increasing on the secondary level without students having career plans or an adequate background for decision making.

It was theorized that decision making can and should take place at an early age and that measured interests, measured aptitudes and previous grade point averages are of value for career decision making.

The literature reviewed showed a trend toward increased use of testing in career planning at the secondary level. There seemed to be agreement that measured interests, measured aptitudes, and achievement are basic psychological components of the guidance and counseling process. The lack of a process model dealing with the application of testing data was noted. No studies were found that attempted to improve the process of selecting students for participation in secondary area vocational programs through the identification of predictor variables.

A sample of 427 juniors geographically representing Genesee County and now attending the Genesee Area Skill Center was identified. The following five hypotheses were developed in null form to examine the relative value of Ohio Vocational Interest Survey measured interest, Vocational Planning inventory measured aptitude and previous grade point average in the prediction of success in area vocational programs:

Hypothesis 1: There is no relationship between interests measured with the Ohio Vocational Interest Survey (O.V.I.S.) and grades received in Skill Center courses.

Hypothesis 2: There is no relationship between grades predicted by the Vocational Planning Inventory (V.P.I.) and grades received in Skill Center courses.

Hypothesis 3: There is no relationship between junior high school grade point average (G.P.A.) and grades received in Skill Center courses.

Hypothesis 4: There is no relationship between measured interest and measured aptitude as measured by the O.V.I.S. and the V.P.I.

Hypothesis 5: A combination of O.V.I.S. measured interest, V.P.I. measured aptitude, and previous grade point average will not predict grades in Skill Center courses at a higher level of significance than any of these indicators taken singly.

The Pearson Product-Moment was used to compute coefficients of correlation necessary for testing hypotheses one through four. Least Squares multiple regression was used to compute the multiple regression coefficients necessary for testing hypothesis five.

Conclusions

Selected O.V.I.S. scale scores, V.P.I. grade predictions, and junior high grade point averages were found to be of value in the prediction of success in some occupational areas. High intercorrelations of variables in some occupational areas tended to reduce the differential predictive value of those variables. Variables which were found to be predictive were generally not predictive in the predetermined relationship patterns identified by counselors and test makers. It was concluded that the interpretation of test results as specified in the tests under consideration in counseling could be worse than having no test data at all.

It was shown that predictive variables when used in combination in a multiple regression equation are of more predictive value than any of the variables taken singly.

Recommendations

Based on the results of this study and conclusions reached it was recommended that an experimental systematized career planning process model be developed and implemented on a trial basis. In this model the handling and interpretation of social facts should be assigned to counselors and the handling and interpretation of psychological facts should be assigned to objective and accountable computer programs. The investment in test materials and processing is far too great to trust to casual interpretations by counselors.

It would be possible for a computer program to allow the inputs from a very large assortment of psychological facts about an individual, match these inputs against established criteria and produce a variety of career plans. Students then, with the assistance of their counselors, could select or deviate from those plans based on social facts brought out by the counselor. Order No. 73-5346, 140 pages.

(33: 4825-A) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Cole, Darrell, Dean
(Last name) (First name) (Middle name)

Exact Title A Study of the Extent of Hybridization Within Four Selected Engineering Technologies by Analysis of Skill and Knowledge Patterns

Degree granted Ed. D., Date 1972, No. of pages in report 127

Granted by Rutgers University New Brunswick, New Jersey
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The essential purpose of this study was two-fold. The first was to compile a list of specific specialty skills and knowledges utilized by the certified engineering technician in each of the areas of Chemical, Civil, Electronic, and Mechanical Engineering Technology, as determined through existing research. The second purpose was to determine which area of specialization was being used by technicians in areas other than their own area of specialization.

Hypotheses

It was hypothesized that the hybridization scores attained by the technicians would differ significantly by levels of certification and among engineering technician specialties. It was further hypothesized that the engineering technician specialties could be ranked in order of use by the technician. It was predicted, first, that the hybridization scores of the electronic technician would exceed those of the chemical, civil, and mechanical technician; second, that the scores of the mechanical technician would exceed those of the chemical, and civil technicians; and third, that the scores for the civil technicians would exceed those of the chemical technician.

Population

The sample of 421 technicians was drawn from a population of 19,044 certified engineering technicians certified as Senior Engineering Technicians (SET), Engineering Technician (ET), and Associate Engineering Technician (AET). These were certified by the Institute for the Certification of Engineering Technicians, Washington, D. C.

Method

The instrument used to gather the data was composed of 267 skills and knowledges extracted from the research literature and randomly arranged within the instrument. The technician was asked to respond to a frequency of use scale where (1.00) indicated frequent use of the skill, (2.00) occasional use, (3.00) rare use, and (4.00) never use the skill. The technicians' responses were summed and means derived by area of technician specialization and by level of certification. These means were then converted to hybridization scores or statistical point means to facilitate its location on the frequency of use scale. The statistical analysis was performed in two stages. The first was four 3 x 4 analysis of variance with unequal N's where level of certification and area of specialization served as the dependent and independent variables. The t test was used to determine differences in means generated by grouping technicians in specialties by level of certification and in levels of certification by specialty.

Findings

The analysis of the data indicated that the technicians' requirement for skills and knowledges from outside his own specialty differed significantly by area of specialization. This was true for each variable. The four variables were not significant by levels of certification. The findings indicated that the technician could be ranked in need for knowledge of his own discipline. The electronic technician was first followed by the civil, mechanical, and chemical technician in order. Further findings indicated that in need for chemical knowledge chemical technicians were first followed by mechanical, civil, and electronic. In need for civil skills the civil technician was first followed by mechanical, chemical, and electronic. In need for knowledge of electronics the electronic technician was first followed by mechanical, chemical, and civil. In need for knowledge from the mechanical area the mechanical technician was first followed by chemical, civil, and electronic technicians. In no case did the hybridization score fall below 2.00 on the frequence of use scale.

Implications

The data indicates that the technician does not use the skills and knowledges of their own discipline to an extensive degree; neither do they express much need for knowledge of additional engineering technologies. In the light of these findings, technical educators need to re-evaluate their curricula.

Order No. 72-26,781, 127 pages.

33: 1599-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Collier, James, Allen
(Last name) (First name) (Middle name)

Exact Title The Development and Evaluation of a Learning System for Power Technology Utilizing Immediate Feedback and Branching in Large-Group Presentations

Degree granted Ed. D., Date 1973, No. of pages in report 128

Granted by Texas A&M University College Station, Texas
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose

The purpose of this study was to develop a learning system for a large-group hydraulic lecture presentation and determine its effectiveness by comparing it to the conventional method of presentation. Measures of learning effectiveness were developed and based on the following variables: (1) student informational achievement, and (2) retention of technical information.

American College Testing Program (ACT) scores and pretest scores were used to establish initial equivalency of the two lecture groups.

Procedure

An outline prepared from the analysis of the existing hydraulics unit, technical hydraulic information, and learning objectives provided the content for both the conventional and learning system large-group lecture presentations. The format was identical for both lecture presentations, including the use of instructional media, with the exception of the learning system.

An essential part of the learning system was the learning device. Its primary purpose was: (1) to provide assistance to students in meeting the learning objectives, (2) to provide both the student and instructor with immediate feedback to determine how well information was comprehended, and (3) to aid the instructor in evaluating the effectiveness of the learning process.

The stimulus used with the learning device was in the form of multiple-choice questions. The purpose of these questions was to provide both the student and instructor with a means of checking the level of knowledge perceived during the learning system presentation.

When students responded to questions asked during a learning system presentation, their selected answers were immediately confirmed as being either correct or incorrect. To provide a means of immediately identifying appropriate branching to supplementary or remedial hydraulics material, a coding procedure was devised. The coding procedure was made easy to use and included key words or topics to encourage students to rapidly locate supplementary information.

Three applications of branching were developed for the learning system to provide students with an opportunity to select learning material that best suited their individual needs.

Participants in the experiment consisted of two intact groups of students enrolled in a required power mechanics course during the second and third quarters of the 1970-1971 academic school year at the University of Wisconsin – Stout, Menomonie, Wisconsin. The basic unit of hydraulics within the power mechanics course was selected as the unit of instruction and was presented during the second and third week of each quarter. There were sixty-three students presented hydraulic information by the conventional lecture method during the second quarter, and sixty-four students presented information by the learning system during the third quarter.

Analysis

Following the implementation of the study, the data were collected and analyzed to determine the effectiveness of the two lecture presentations. A nonequivalent group pretest-posttest design was used. The data were analyzed through the use of the analysis of covariance method of statistical control.

Initial group equivalency was established by analysis of the ACT and pretest scores. After treatments were applied, a posttest was administered to determine differences in informational achievement scores. Five weeks after the posttest was given, a retention test was administered to determine differences in technical information retained by students.

Conclusions

The learning system was significantly superior to the conventional technique in terms of informational achievement. Therefore, the learning system was an effective procedure for improving informational achievement in hydraulics lectures.

The learning system was significantly superior to the conventional technique in terms of retention. Therefore, the learning system was effective in assisting students in hydraulics lectures to retain technical hydraulics information.

Order No. 73-21,717, 128 pages.

34: 1110-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Confrey (Last name), Evan (First name), E. (Middle name)

Exact Title The Development of a Model for a Three Dimensional Occupational Profile

Degree granted Ph. D., Date 1967, No. of pages in report 189

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The research evolved a vehicle capable of exhibiting a three dimensional occupational profile and established techniques to test the significance of any observed relationships among the dimensions. The major emphasis of the investigation was placed on the presentation of the concept of the vehicle as an instrument which could be used in future research. Therefore, the vehicle was described in terms of its operative mechanism as well as its theoretical functions. An interdisciplinary approach to the solution was manifested by the selection of the model technique as the implementing vehicle.

Worker trait components in the form of literal terms were chosen as the input elements for the model. The required elements were extracted from a master matrix and were categorized into lists which constituted two dimensions of the three dimensional profile. A hierarchy of two dimensional profiles established the third dimension. The model was designed to produce a series of synthetic patterns which represented an approximation of the three dimensional organization of a group of companion occupations. The behavior of the third dimension within the major occupational structure was influenced by the degree of emphasis placed on the workers' relationships with data, people, and things. The high speed electronic computer was employed to assist the investigator in the examination of the theory inherent in the model design and to explore alternatives.

A statistical analysis was made to determine the degree of agreement associated with the ranking of eight engineering occupations by the order of the permutations of the workers' function in relation to data, people, and things. A further analysis was made to test whether the data-people-things relationship permutations differed significantly. In order to induce growth of the model provisions were made in the design for the updating of the element lists and for the introduction of other statistical procedures.

The major finding of the research was the development of a prototype model which demonstrated the feasibility of utilizing the concept of a three dimensional occupational profile. In terms of the findings of the research it was concluded that the results of the statistical analysis of the worker functions offers a means to develop theories about occupational-educational relationships without expanding the current body of occupational-educational data. Through further emphasis on the structure of this model, the presented concept of the three dimensional occupational profile can be expanded to increase the educator's potential to develop methods and strategies which would stimulate research which reflects the analysis of changes in relationships in an occupational system as well as to verify the presence of factors already reported.

The appendicies contain the computer oriented description of the specifications of the computer subprograms, the structure of the internal storage of the data, a computer write-up for the IBM 1620, a sample problem which includes the input and output for fourteen clerical occupations, and the flowcharts and subprogram listings.

Microfilm $3.00; Xerography $8.60. 189 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Crawford , Newton , Edwin
(Last name) (First name) (Middle name)

Exact Title A Study of the Historical Growth and Development of Federally-Assisted Adult Vocational Education in the Public Schools Between 1917 and 1970.

Degree granted Ed. D. , Date 1972 , No. of pages in report 157

Granted by The George Washington University Washington, D. C.
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to identify the major federal legislation which has been enacted in support of public school adult vocational education in order to analyze the federal government's role in the growth and development of these programs. A secondary purpose of the study was to highlight some of the political, economic, and social forces which have influenced the inception, growth, and development of adult vocational education. In addition, the study attempted to answer the following questions: (1) What were the nature and extent of the growth and development of federally-assisted adult vocational education programs in the public schools of the United States from their emergence in 1917 to 1970? (2) What were some of the major forces, events, institutions, and agencies which contributed to the emergence and subsequent growth and development of these programs? (3) Did the federal legislative and financial support for public vocational education noticeably influence adult program growth and development?

Conclusions

1. Major credit for initiating organized state support for public vocational education, including adult programs, must be attributed to Governor Douglas of Massachusetts, who appointed the Commission on Industrial and Technical Education in 1906.

2. The first significant effort to focus national attention on the need to provide public support for vocational and industrial education in this country was brought about by the National Society for the Promotion of Industrial Education, formed in 1906.

3. The pattern by which the President and/or the Congress periodically turned to national advisory councils and commissions for advice and recommendations regarding federally-assisted public vocational education dates back to 1914 and has continued to prove successful through the years.

4. Public vocational education personnel and programs made a significant, direct contribution to World War I and II production and adult training efforts.

5. Both adult and total enrollments in vocational education programs showed relatively steady increases over the period covered in this study, with the notable exception of some years during World War II and the Korean War, and during periods of economic depression.

6. Total adult vocational enrollment changes through the years since 1917 have, for the most part, paralleled enrollment increases and decreases recorded for the overall program effort in federally-assisted vocational education conducted in the public schools.

7. Adult enrollments on the whole rose through the years, with the exception of 1970, as additional legislation was enacted or existing laws were modified to provide increased federal support and program flexibility.

8. The number of participants in the individual occupational areas of adult programs generally followed the same pattern shown by total adult vocational education enrollments for the period covered by the study.

9. Variances in individual adult occupational areas largely reflect changes in program emphasis, funding authority, and socioeconomic conditions, as well as the direct and indirect effects of wars.

10. Lack of agreement on program definitions, inconsistencies with respect to reporting requirements and procedures, and related problems have resulted in serious gaps and inadequacies in the official documentation of the historical growth and development of federally-assisted public adult vocational education programs.

11. No coordinated and federally-supported mechanism exists to encourage innovative and exemplary adult vocational education program efforts.

Order No. 72-31,940, 157 pages.

33: 2681-A Dec '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Croy, Floyd, Emerson
(Last name) (First name) (Middle name)

Exact Title Knowledge and Skill Requirements of Motorcycle Mechanics with Implications for Course Development

Degree granted Ph. D., Date 1972, No. of pages in report 228

Granted by Iowa State University Ames, Iowa
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The number of registered motorcycles in the United States increased rapidly during the late 1960's. This increase resulted in attention to the nationwide shortage of qualified motorcycle mechanics.

The purpose of this study was to determine the need for motorcycle mechanic training in Iowa and the skills and knowledge these individuals should possess. In addition it was felt the background information obtained would help those who might wish to initiate such training or study this industry further.

A questionnaire survey was conducted involving 121 motorcycle dealerships and 240 motorcycle owners. During visits to twenty-four dealerships, questionnaires were filled out by thirty-six currently employed motorcycle mechanics, and shop service records were randomly selected to determine the kinds of work being performed. A total of 974 individual repairs were identified from these records. Eight motorcycle manufacturers and four persons in industry leadership roles responded to a letter inviting discussion on the subject of motorcycle mechanic training.

Analysis of the data revealed that in the next two years the dealers responding would hire 141 full-time motorcycle mechanics, nearly doubling the 148 they currently employ. They would also hire ninety-nine part-time workers in the next two years. Most dealers indicated they did not know where they would find qualified workers.

Of the motorcycle owners responding, 43.2% have already experienced a shortage of motorcycles that are 1970 or newer, implying an increasing need for service in coming years.

Only 44% of the dealers were making a profit on their service shops. Half of the dealers employed parts and/or service managers and those who did were less likely to make a profit. Dealers make little use of their service records to analyze that operation as it regards hiring staff and stocking of spare parts. Many assign costs to their service operation that belong to the sales department.

The only formal preparation the motorcycle mechanics surveyed had for their trade, was the two week company service schools that had been attended by one-third of them. Almost half had two years or less of experience in their trade.

On the basis of the study it was concluded that the motorcycle mechanic shortage will grow, probably limiting the growth of the industry in Iowa. Training of these workers at area vocational schools should be implemented as soon as possible. The shortage could be met to some extent by adult evening courses in motorcycle maintenance for owners. The dealers and their foremen could benefit from business principles and management workshops. The subject matter emphasis of existing full scale motorcycle mechanic training programs appears to be accurate.

Order No. 72-26,912, 228 pages.

33: 1600-A Oct. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Cunico (Last name), Gerald (First name), Eugene (Middle name)

Exact Title A Delphi Approach to The Future of Industrial Education

Degree granted Ed. D., Date 1973 No. of pages in report 131

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: The purpose of the study was to investigate and develop a projection of the future of Industrial Education by utilizing the Delphi Technique. Secondly, the study was designed to survey a constituent group of Industrial Educators and State Directors of Industrial Education in order to determine if the group was in accordance with the opinions expressed by the Delphi panel.

Source of data and method of study: The Delphi technique provided the necessary data for the study, and the necessary methodology.

Findings and Conclusions: The data collected from the Delphi Technique disclosed that Industrial Education in the future must provide the experiences needed to allow a student to enter into and become a part of the vast and complex industrial and technologican society in which he finds himself. The data also indicated that the constituent group of Industrial Educators and State Directors of Industrial Education are in accordance with the Delphi panel members on the future goals, objectives, and orientation of Industrial Education.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Dale, Sam, E., Jr.
(Last name) (First name) (Middle name)

Exact Title Activities and Factors Considered Important in the Implementation of Career Education Programs at the Pre-High School Level in Louisiana

Degree granted Ph. D., Date 1972, No. of pages in report 221

Granted by The Louisiana State University and Agricultural and Mechanical College
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose

This study was an attempt to identify activities and factors essential for the implementation of a pre-high school career education program in Louisiana, as conceived by six professional education groups: parish superintendents, parish supervisors, guidance counselors, teacher educators, principals, and teachers.

A knowledge of the concepts held by those administering, structuring curriculums, counseling, training teachers and teaching will give direction, scope, content, and methodology to the relatively new program of career education in the public schools of this state. Not only is it important that one knows what others conceive, but that all groups have a clear philosophy of the role they are to assume in performing the task of educating all people for useful and productive lives.

Also this study was an attempt to provide information that will be useful to educators in the state of Louisiana as they approach educational reform and assist in the development of the concept that career education offers a reasonable goal to help young men and women find fulfilling and productive lives in our society.

Procedure

The descriptive survey method utilizing the questionnaire technique was developed for this study. Questionnaires consisting of ten major divisions with 87 activities and factors were mailed to 66 parish and city superintendents, 66 parish and city supervisors, 66 guidance counselors, 17 teacher educators, 66 principals and 66 teachers.

The instrument was first submitted to a jury of professional educators in colleges, research centers, and State Department of Education personnel throughout the South for clarity, validity, and pertinency of items. All members of the jury except on responded with comments and suggestive changes. These suggestions were incorporated into the Data Gathering Instrument and submitted to the researcher's doctoral committee for review.

The mean responses of the six groups were calculated to obtain a rating for each item from each professional group. As a test for significant differences among these groups, the analysis of variance procedure was used. The F-test was applied in determining the degree of difference existing. Finally the null hypothesis was set up as a basis against which each test was to be made and was accepted or rejected at the .05 level of confidence.

Findings

Significant differences existed among the responses to 21 of the 87 activities at the .05 level of confidence. In most cases these differences were based on degree of importance assigned rather than concepts of the roles to be assumed. This is reflected by the fact that all activities were rated at least important by the six groups.

Two of the areas—Administration and Out of School Sources—were extremely important according to the average of all responses.

Eight of the areas—Supervisors; Instructional Program Grades K-6; Instructional Program Grades 7-9; Teaching Personnel to Teach Career Education Grades K-6; Teaching Personnel to Teach Career Education Grades 7-9; Guidance Service, Specialized Teachers and Research—were important according to the average of all responses. No areas were considered unimportant by the responding groups.

Order No. 72-28,335, 221 pages

33: 2250-A Nov'72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Dent (Last name), Jack (First name), Edwin, Jr. (Middle name)

Exact Title A Descriptive Survey of the Administration, Organization, and Staffing of Georgia Area Vocational-Technical Schools

Degree granted Ed. D., Date 1972, No. of pages in report 188

Granted by University of Georgia (Name of institution) Athens, Georgia (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Although the area vocational-technical school can trace its history to pre-revolutionary Philadelphia and claim Benjamin Franklin as a founding father, the area schools are generally a product of rather recent federal legislation. The state of Georgia recognized the need for widespread specialized and advanced training for its citizenry and quickly developed, with some federal assistance, a system of 25 area vocational-technical schools throughout the state.

In an effort to understand some of the characteristics of the area school and to provide some basic research in an area of higher education where there has been a deficiency of investigation, an examination of the area vocational-technical schools of Georgia was instigated. The objectives of the study included: the determination of certain of the administrator's responsibilities; the basic organization of the area school; the locus of decisions on funding, curriculum, staffing, and personnel questions; the input of local school districts and the State Department of Education of Georgia; the development of a profile of administrators and faculty in terms of personal, educational, and professional characteristics; the determination of the attributes of a "Model Director" as characterized by area school administrators and the congruence of these administrators' responses; and the determination of faculty attitudes about selected professional questions and the congruence of the response to those questions by degree faculty and license faculty.

To obtain the data for analysis, questionnaires were sent to all 164 administrators and 219 of the faculty of the area schools. The responses of administrators amounted to 73.8 percent of their population, while the faculty replies totaled 77.6 percent of that sample. The selected major findings from the returns included: the typical administrator was male, Caucasian, married with dependent children, between 26 and 45 years of age, involved in church work, service clubs and youth work; the typical faculty member was male, Caucasian, married with dependent children, between 26 and 45 years of age, involved in church work and youth work; the typical administrators earned from $11,001 to $14,000 annually, while the typical faculty salary was from $9,000 to $11,000 yearly; and 25 percent of the faculty and 55 percent of the administrators had public school teaching experience. Additional findings from the personnel surveyed included: an 85 percent agreement between degree and license faculty on selected professional questions; and the local district is more involved with funding, personnel, staffing, and curriculum questions than is the State Department of Education. Seven major administrative areas of responsibility were identified by frequency as: general administration and supervision; staffing and personnel; curriculum administration and development; plant maintenance, operation, and equipment; business activities; public relations; and student personnel services. The responses of the different administrators were paralleled in determining characteristics of a "Model Director" for an area school. The major attributes included, in order: human relations skills, commitment to vocational-technical education, employment experience in business or industry, planning and organizational skills, common sense, and vocational-technical teaching experience. Some of the pertinent findings related to the area school's organization were that the director is the major decision-maker and a formal, three level organizational structure of director, co-ordinator, and faculty is the frequent pattern.

As a result of the findings certain major conclusions were drawn: congruence of the surveyed characteristics of administrators and faculty, parallel responses between administrators, similar selected attitudes between faculty, and a close organizational relationship between the area school system and the public school system.

Order No. 73-5680, 188 pages.

(33: 4872-A) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Dent, James, Arthur
(Last name) (First name) (Middle name)

Exact Title A Study of the Motivating Factors in Student Program Selection in Area Vocational Schools in Southeastern Indiana

Degree granted Ed. D., **Date** 1972, **No. of pages in report** 219

Granted by University of Cincinnati Cincinnati, Ohio
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

PURPOSE

The purpose of this study was to identify the reasons students had for selecting the programs in which they were enrolled in area vocational schools in southeastern Indiana.

Considerable amounts of time and energy have been expended by school workers in an effort to determine what steps should be taken to assist students in making sound vocational program choices. To add information to be used in planning programs to aid students in the selection process, this study went directly to students to ascertain the reasons they felt were important in choosing a program.

PROCEDURE

The information included in the study was compiled as a result of several sequential steps. First 700 students were asked to write statements explaining the reasons they had for choosing the programs in which they were enrolled. Next, these statements were placed into groups of similar statements from which eleven basic statements were developed. The eleven statements were used to formulate a fifty-five item paired comparison questionnaire that was administered to 1392 students, all of whom were attending or enrolled to attend one of three area vocational schools in southeastern Indiana. The schools are located at Connersville, New Albany, and Versailles. For purposes of analyzing the data, the 1392 students completing the questionnaires were divided into sub groups. All students who were attending an area vocational school at the time the study was conducted were designated as Group I students. Group II students were those who had enrolled but had not yet begun to attend one of the area schools. Since students enrolled in both Groups I and II of eighteen separate programs of vocational education completed questionnaires, thirty-six distinct tables of data were generated. These thirty-six, plus two sets of data summarizing the responses of all students in Groups I and II, bring the total for separate sets of data to thirty-eight.

A program was written for a computer to compile the data gathered on the questionnaires. The computer print-out data was used to construct a series of five sets of tables. These were: Tables of Frequencies of Judgements, Tables of Proportions of Judgements, Sigma Value Tables, Scale Separation Tables, and Tables of Scales of Statements. Each of these separate sets of tables indicated, in differing forms, the relative strength of the eleven statements as influencing factors in student program selection. The last set of tables, the Scales of Statements, presented a graphic scale of each statement that enables the reader to perceive visually which statements had the greatest influence on the various groups of students involved in the study.

FINDINGS AND RECOMMENDATIONS

The most consistent finding throughout the study was that students choose programs of vocational education to improve their prospects for satisfactory employment after they complete high school. Another significant finding was that the students identified the statements relating to improving chances for success in educational pursuits after high school as the second most important reason for choosing a program. Finally, it is significant that a statement pertaining to counselor influence in program selection was placed in a low position by the students; generally last or next to last among the various groups of students.

From the findings in the study, it would be recommended that:

1. Strong emphasis be given to providing prospective students for vocational education with detailed information on the various characteristics of the jobs that may result from the vocational programs available.
2. Information should be made available to prospective students concerning the relationship between the various programs of vocational education and future educational opportunities.
3. Counselors should develop programs of working with prospective vocational students that will bring them closer to the students in the selection process. Through a closer working relationship, students will depend more on counselors for needed assistance.
4. Systems developed to assist students in vocational education program selection should include the involvement of parents in the process..

RECOMMENDATIONS FOR FURTHER RESEARCH

Several areas of research could be pursued to provide additional information concerning the processes by which students are motivated to choose programs of vocational education. Among these are included the following recommendations for further research.

1. A research study to determine what factors counselors and vocational educators believe are important to students considering programs of vocational education.
2. Research to determine the extent to which the reasons students had for choosing programs are fulfilled after they have left school.
3. Finally, a study of students who selected programs but did not complete them would fill an existing void in the information as to the reasons students choose programs.

SUMMARY

It has been the intent of this study to solicit from students, who enrolled at area vocational schools, the reasons that were most important to them as they decided upon particular programs of vocational education.

The paired comparison questionnaire statistical procedure afforded students the opportunity to assess each of eleven motivational statements in comparison to one another. A total of 1392 students responded to the eleven statements [illegible] times. For purposes of inspecting the data according to curriculum choices, the 1392 students were subdivided into thirty-six groups. The thirty-six groups were made up of incoming and presently attending students in eighteen programs of vocational education.

The result of the students' responses was to demonstrate that there is a definite pattern in factors that motivate students to select particular programs of vocational education. Among the thirty-six groups of students, all but one group selected as their prime motivation the desire to improve prospects for employment after completing high school. At the other end of the scale, students indicated they were least motivated by counselors advising them to take particular programs. Students also indicated that the desire to choose the same programs that friends selected has very little motivational influence.

The conclusion that is to be drawn is that there is a distinct pattern among the factors that influence student program selection. Further, it can be concluded that programs of providing assistance to students involved in choosing programs can be developed to complement the identified motivational factors.

Order No. 72-31,923, 219 pages.

33, 2830-A, Dec. 172

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Dittenhafer (Last name), Clarence (First name), Albert, Jr. (Middle name)

Exact Title A Comparison of Twelfth Grade College Preparatory and Vocational Technical Students' Personality Needs and Environmental Press As a Function of Program Separation

Degree granted Ed. D., Date 1972, No. of pages in report 173

Granted by Rutgers University (Name of institution) New Brunswick, New Jersey (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

The purpose of the study was to identify and compare high school senior students' perceptions of their personality needs, environmental press, and needs-press relationships across program and degree of program separation (physical) variables.

The following research hypotheses were examined in the study:

Significant differences will exist in students' mean scores on the—

(R1) twelve AI first-order factors between the college preparatory and vocational-technical programs.

(R2) twelve AI first-order factors between no (comprehensive high school), partial (part-time area vocational-technical school), and complete (full-time area vocational-technical school or academic high school) degrees of program separation.

(R3) seven HSCI first-order factors between the college preparatory and vocational-technical programs.

(R4) seven HSCI first-order factors between no, partial, and complete degrees of program separation.

(R5) There will be significant correlations between mean rank scores on the thirty AI and HSCI scales.

Procedure

The sample was comprised of 1,877 senior students in eighteen secondary schools in Pennsylvania. The independent variables were program (two levels) and degree of program separation (three levels). The dependent variables were the twelve Activities Index (AI) and seven High School Characteristics Index (HSCI) first-order factors. Additionally, thirty AI and HSCI scale scores were utilized in attempting to ascertain needs-press relationships.

Multivariate analysis of variance and multiple discriminant function analysis (DFA) were used to answer research hypotheses R1, R2, R3, and R4. Spearman Rank Order correlations were computed on the ranks of the thirty AI-HSCI scale means to answer R5.

Results

Five of the twelve AI factors were significant ($p < .01$) for program. College preparatory students had higher mean scores for the factors entitled, Intellectual Interests, Motivation, and Expressiveness-Constraint, while vocational-technical students were higher on Audacity-Timidity and Applied Interests.

Two AI factors were significant for degrees of program separation. The means for the Applied Interests factor decreased with increased program separation. The Closeness factor means showed complete separation the highest followed by no and partial.

Environmental press differences were found; however, a significant interaction effect qualified the results. Five of the seven HSCI factors were significant ($p < .01$) for program. Vocational-technical students had higher mean scores than their college preparatory counterparts on all the significant factors. The factors were entitled, Intellectual Climate, Expressiveness, Group Life, Personal Dignity, and Orderliness.

Only two of the HSCI factors were significant for degrees of program separation. The mean scores for the significant Expressiveness factor increased directly with increased program separation. Complete separation had the highest mean score on the Orderliness factor followed by no and partial separation.

Spearman Rank Order correlations were computed on the rankings of scale means to estimate needs-press relationships. None of the coefficients were significant at $p < .05$.

Conclusions

Interpretations of the data analysis prompted the following conclusions:

1. College preparatory students perceived high needs for intellectual endeavors reflecting a *people* orientation, while vocational-technical students perceived needs for the tangible and concrete reflecting a *thing* orientation.
2. The perceived personality needs differences across degrees of program separation suggested the physical proximity of the two program groups affected the interpersonal relationships among students.
3. Vocational-technical students evidenced higher mean scores across all the significant environmental press factors. However, several of the environmental press were exactly opposite the perceived personality needs for the students.
4. While complete separation schools seemed to satisfy some personality needs for students, no separation (comprehensive high schools) seemed the most viable administrative configuration for servicing the diverse needs of today's high school students.
5. The lack of significant needs-press relationships suggested that high school environments should attempt to facilitate the personality needs of the student population.

Order No. 72-26,783, 173 pages.

33: 1600-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Divine (Last name), Lloyd (First name), Eldon (Middle name)

Exact Title Attitudes Toward Occupational Education in the Community-Junior College.

Degree granted Ed. D., Date 1973 No. of pages in report 154

Granted by University of Arkansas (Name of institution) Fayetteville, Arkansas (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To determine the attitudes of counselors, employers, parents of juniors, and high school seniors toward occupational education in the community-junior college.

Source of data and method of study: A Likert-type attitude scale was administered to the counselors, parents of juniors, and the seniors at ten selected high schools. The attitude scale was also administered to employers of former occupational program students. The instrument used was developed for this study.

Findings and Conclusions: The findings are as follows:

1. The community-junior college should offer a variety of occupational education programs.
2. Occupational education is not considered a program for the low ability student only.
3. There is some question regarding the adequacy of preparation of occupational education graduates.
4. There is some reservation regarding occupational education receiving the same emphasis as the transfer program.
5. Occupational education was considered to be a part of the community-junior college instructional program.
6. Occupational education is considered less collegiate than other programs.

Conclusions:

1. Counselors, employers, parents, and seniors have a positive attitude towards occupational education in the community-junior college.
2. Occupational education is recognized as part of the community-junior college instructional program.
3. The community-junior college should offer a variety of occupational programs to meet the needs of the area it serves.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Douglas, David, Eugene
(Last name) (First name) (Middle name)

Exact Title Management Information Systems for the Construction Industry

Degree granted Ph. D., Date 1973, No. of pages in report 150

Granted by University of Arkansas Fayetteville, Arkansas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This research examines management information systems as associated with the construction industry. The basics of a management information system are presented in order to justify the system that was developed. Critical Path type networks serve as the decision model for this system.

Revision of a computer based network processor was required for development of this management information system. Project 1, a subsystem of ICES, is the modified network processor. ICES is a problem oriented system developed by M.I.T.'s development.

The design of the information flow to the networks is given in detail. This design includes flowcharts of the systems that merge the cost data and the progress data together for reporting. These systems are designed around existing payroll, inventory, purchasing, etc., programs of the company. The degree of revision to these existing programs necessary to implement this system varies from company to company.

The problem oriented system makes it very easy for a manager to use. If implemented with terminals, the manager has instant information; restricted only by the speed of the flow of the information to the system.

Order No. 73-27,384, 150 pages.

34: 2040-B Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Driscoll, Edward, Francis
(Last name) (First name) (Middle name)

Exact Title An Experimental Study of Two Methods of Teaching Electrical Science

Degree granted Ph. D., **Date** 1964, **No. of pages in report** 193

Granted by University of Connecticut Storrs, Connecticut
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to compare the relative effectiveness of two methods of teaching basic electrical circuit principles at the secondary school level. One method, designated Method A, was a traditional deductive-descriptive method; the second, Method B, was a problem-solving method.

The hypotheses to be tested were:

1. There is no significant differences in achievement in the area of basic electrical circuits between students taught by Method A and students taught by Method B.
2. There is no significant difference in achievement in the area of basic electrical circuits between students taught by Method A and students taught by Method B, for various levels of ability.

Research Design and Treatment of Data

Method A was characterized by teacher-selection of the learning materials and the fact that principles and generalizations were presented early in the learning procedures. In addition, textbooks, study assignments, and laboratory exercises were utilized. Under Method B, problems and problem-solving activities were determined by the students and teacher working together. Principles and generalizations were derived from the experimentation and study engaged in by the students. Textbooks and regular study assignments were not part of this method. However, references were provided and guide sheets were used by the students as they sought solutions to problems.

Method A was used with one class and Method B with a second class in each of six eastern Massachusetts high schools. Within each school the subjects were assigned at random to the two classes. Both classes were taught by the same instructor. The total number of subjects in the group formed by the Method A classes was 101. The total in the Method B group was 104.

Each class met one period per day, five days a week. With the Method A classes two periods per week were devoted to classroom activities. With the Method B classes a definite amount of time was not assigned for such activities. However, some sessions were held to familiarize the students in these classes with problem-solving procedures.

Approximately ten weeks was the time required to adequately cover the study of basic electrical circuits under Method A. Thirteen weeks was the average time required for the application of Method B.

Preliminary data were provided by a pre-post basic electrical circuits achievement test and the Otis Quick-Scoring Mental Abilities Test, Gamma, Form FM. Post-treatment data were provided by a reapplication of the pre-post achievement test.

The testing of the research hypotheses was accomplished by means of covariance analysis. For this analysis intelligence data were used to control the effects of the ability variable.

Conclusions

The following conclusions resulted from statistical analysis and examination of the study data.

1. The deductive-descriptive and the problem-solving methods were both successful in producing achievement in the area of basic electrical circuits.
2. The deductive-descriptive method was superior, at the one per cent level, to the problem-solving method in bringing about achievement in the area of basic electrical circuits.
3. The superiority of the deductive-descriptive method over the problem-solving method was general and did not vary significantly between various levels of ability.
4. Although the superiority of the deductive-descriptive method did not vary significantly between various ability levels, it was more apparent at the higher level than at average or lower levels of ability.
5. The deductive-descriptive method was more efficient since it produced a significant difference in achievement with an average duration of treatment of ten weeks, while under the problem-solving method the average duration of treatment was thirteen weeks.

Microfilm $2.75; Xerography $8.80. 193 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Duhon (Last name), Howard (First name), (Middle name)

Exact Title A Development of a Conceptualized Model for Occupational Education With Computer Adaptability

Degree granted Ed. D., Date 1972, No. of pages in report 163

Granted by University of Houston (Name of institution) Houston, Texas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to analyze the occupational education department of a community college, and to develop a model that would facilitate the decision-making process of administrators who are responsible for the allocation of resources within that department. Four problems were identified for this study:

1. To develop a conceptualized model that would help occupational education administrators make decisions concerning the overall allocation of resources.
2. To develop an electronic data processing system for storage, retrieval, and processing of data used in decision making.
3. To develop an array of the characteristics of the types of decisions which must be made, so that these characteristics may be used as criteria to facilitate the setting of priorities.
4. To organize the model so as to treat data in four dimensions
   - (a) students enrolled in their respective occupational programs,
   - (b) faculty required to provide these programs,
   - (c) physical facilities required for these programs, and
   - (d) financial resources required to carry on these programs.

The conceptual model which was developed centered around the output of a computer program and comprised a systematic decision-making process. In constructing the model four essential attributes were demanded; ability to organize, ability to facilitate the discovery of new facts and methods, ability to obtain verifiable predictions, and ability to quantify the predictions.

An array of decision-making characteristics was developed in order to provide criteria for the setting of priorities for decisions. An information questionnaire was prepared and sent to thirty occupational education administrators. The data received from this questionnaire were instrumental in the development of the array of the characteristics.

The model was developed by utilizing real data from the occupational education department of an actual subject institution, and the data were organized in four dimensions: students and their programs, faculty, facilities, and financial resources. In addition to analyzing data in the four separate dimensions, the study included an analysis of intra-dimension interactions, inter-dimension interrelationships, and inter-dimension interdependencies. The computer program presented the four dimensions in such a manner as to produce the presentation in both narrative and graphic form. Correlation of various data in each dimension provided an accurate means of observing past growth and future predictions.

The computer program model was used to simulate the operation of certain factors of the occupational education department in the community college. Actual data, over a three year period of time, were used to simulate real world situations, and predictive equations were developed from the data. The simulation was an expression of the investigator's theories of how the actual system operates.

The following recommendations were made as a result of this study:

1. The collection and maintenance of relevant information should be further analyzed. Since it is not feasible to store and treat vast bodies of data, there is need for research to help establish a process for scrutinizing data to determine what is relevant and useful in the decision-making process.
2. The primary outputs of occupational education programs need to be further refined, redefined, and classified in order that they will be in the form which is most useable for administrators.
3. The evaluation of occupational education faculty, student enrollments, and programs should be accomplished before overall allocation of resources is made.
4. Since there is an increasing use of models, systems, and simulation in educational administration, there should be a major effort in the development of terminology and central ideas relevant to model building and systems analysis. The vagueness which now exists is a handicap to modeling efforts.
5. There should be further study to test concepts, especially those based on the use of models, to help administrators understand the interrelationships, and interdependencies between factors and dimensions of their programs.

Order No. 72-26,938, 163 pages.

33: 1601-A Oct. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Durana, Ines, ______
(Last name) (First name) (Middle name)

Exact Title A Study of Selected Factors Which Led to Federal Legislation and Its Subsequent Influence on Public Education for the Health Occupations.

Degree granted Ph. D., Date 1972, No. of pages in report ______

Granted by University of Maryland College Park, Maryland
(Name of institution) (City, State)

Where Available: Microfilm ( ) Microfish ( ) E.R.I.C. ( )

Purpose of the Study: To determine both the factors which led to federal legislation, 1917-1961, and the influence this legislation exerted on the growth pattern of health occupations education within the public school system.

Source of data and method of study: Six topical questions were posed to provide a theoretical framework for the study. To determine factors which led to federal legislation in the health occupations, the social origins and evolution of the medical profession were traced through a review of the literature. Particular attention was given to medical education and practice, to the changing role of the hospital, to the evolution of medical societies and to the emerging medical specialties

Findings and Conclusions:

1. Health occupations education evolved parallel with the growth of medical specialties.
2. Demand for increased medical care required new and expanded services, with an attendant growth in the numbers and types of specialties within the stratified hierarchy of the medical profession.
3. Practical nurses, the first of the health occupations to emerge at the vocational-technical level, led the way for the proliferation of others.
4. The hospital was no longer the primary training ground. The contemporary hospital shifted its aims and priorities to the performance of three basic functions: 1) service, 2) education, and 3) research.
5. The duration of practical nurse training programs was lengthened, while their orientation shifted from home nursing to the hospital, and later to high schools and community colleges.
6. The new health occupations created by specialization, through their representative associations, are subject to increasing control of their licensing and their practice, by means of registration and certification.
7. Factors leading to development of federal funding:
   a) Economic Factors
   b) Medical and technical factors
   c) Social
8. Under the Federal Board for Vocational Education, nursing was one of the first occupations (as a household occupation) considered for federal aid.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author DuVall (Last name), John (First name), Barry (Middle name)

Exact Title An Analysis of Synergized Learning Experiences With Implications for Curriculum Development in Industrial Arts Education

Degree granted Ph. D., Date 1972, No. of pages in report 226

Granted by University of Maryland (Name of institution) College Park, Maryland (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

The problem of this study was twofold: 1. to determine if synergized learning experiences provide implications for curriculum development in industrial arts education; 2. to determine whether synergized learning experiences are valuable in terms of the development of self concept.

Statement of the Purpose

The purpose of this study was: 1. to ascertain whether curriculum in industrial arts education need put increased emphasis on the relationship of the individual and his environment; 2. to determine whether learning environments could be designed which would more effectively lend themselves to synergized learning experiences than the typical general laboratory situation; 3. to ascertain the effect of synergized learning experiences in the development of self concept in industrial arts education; 4. to provide research evidence comparing curriculum emphasis placed primarily on the student rather than on systems of content delineation; 5. to ascertain the value of simulated industrial environments as motivational stimulators; 6. to ascertain the effectiveness of the game in play situation as a valid means of simulation.

Design of the Study

The design of this experiment was characterized as being a three treatment group experimental type with fifty-six subjects comprising the population under study. One pretest and two posttests were used to evaluate and observe behavioral changes resulting from specific group treatments.

Order No. 73-17,036, 226 pages.
34: 159-A July '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Edsall (Last name), Alan (First name), Richard (Middle name)

Exact Title A Comparison of Orientation VS. No Orientation For Beginning T&I Teachers in Colorado - 1972

Degree granted Ph. D., Date 1972, No. of pages in report 104

Granted by Colorado State University (Name of institution) Ft. Collins, Colorado (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The major goal of this study was to determine if attending an orientation workshop would affect the adjustment toward teaching of the beginning trade and industrial teachers in Colorado for the 1971-72 school year. The procedure utilized to evaluate this adjustment was to analyze the supervisory evaluation form used by the Trade and Industrial Division, the State Board for Community Colleges and Occupational Education, Denver, Colorado.

Participants of the study were the beginning trade and industrial teachers in Colorado for the 1971-72 school year. The twenty-six teachers in this study were from nineteen educational settings. They represented local high schools, comprehensive high schools, area vocational schools, community colleges, and the state training school.

An orientation program for the beginning trade and industrial teachers in Colorado was beneficial to this group and showed a significant difference in ratings on the state supervisory report form when compared with those beginning trade and industrial teachers who did not attend an orientation program during the summer of 1971 or during the fall or winter of 1971-72.

The analysis of the groups showed that the areas of significant difference were: 1. Shop Organization. 2. Student Records. 3. Instructional Materials. 4. Housekeeping. 5. Advisory Committees. 6. Shop Facilities.

No significant difference occurred in the following areas: 1. Safety Practices. 2. Enrollments. 3. Youth Organizations. 4. Student Participation.

No significant difference in adjustment toward teaching was found as a result of the influence of the following variables: a. age. b. Class size. c. Education. d. Enrollment. e. Military Service. f. Previous Teaching Experience. g. Vocational Director. h. Years of Occupational Experience.

No significant difference in individual perceptions of the role of the teacher among the experienced trade and industrial teachers, the beginning trade and industrial teachers, and the trade and industrial teacher education staff was found.

Order No. 73-13,057, 104 pages.

33: 6801-A June '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Edstrom (Last name), Carl (First name), Alfred (Middle name)

Exact Title Occupational Training Patterns and Characteristics of Selected Personnel in the Construction Industry in Kinshasa

Degree granted Ed. D., Date 1972, No. of pages in report 252

Granted by University of Illinois at Urbana (Name of institution) Champaign, Illinois (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Critical to the development of the Third World nations is the maximum use of human resources, the development of which must come through some form of skill training, either formal or informal. Basic to providing efficient training are the issues of the type of institution in which training should be given and the nature and responsibility of training. Sufficient data must be found to recognize these issues, to identify functions and to formulate policy. However vital data for decision-making are often deficient in Third World nations.

The purpose of this study was to identify three aspects of national life in Zaire. These were: the formal and informal means of occupational preparation, an employing institution, and the characteristics of the personnel of this employing institution.

A bi-lingual instrument in French and Lingala was prepared and administered to 200 craftsmen and technicians of the construction industry.

The subjects revealed their strong direction toward modernity in their movement to population centers, acceptance of recently-introduced forms of religious faith, and a higher rate of primary school completion among younger men. The majority of the subjects indicated they had made their own career decisions. The subjects acquire their skills in formal training schools and/or informal training, including on-the-job training, working for a member of the family, or by casual means. The group trained on-the-job was of special interest. Some worked as unpaid apprentices and paid their employer for training, others paid a co-worker. In addition to the traditional African form of paying for training, other details were a strong master-apprentice relationship and a ceremony marking the completion of training.

The professional and technical training did not appear to insure advantages as to longevity with employers, length of on-the-job training, periods of unemployment or salary. One possible advantage of formal training was higher entry level and job stability. All subjects including professional and technical school attenders received on-the-job training.

The modern sector of the construction industry, best qualified to train craftsmen, was not making a significant contribution to training. The majority of those trained solely in on-the-job training were trained by the intermediary or traditional segments of the construction industry. The subjects indicated a strong tendency for upward mobility which was shown in the skills acquired before they attained the skill in which they were employed at the time of this research.

An indication of the level of training can be seen in the low percentage of nationals found in supervisory roles, particularly site-superintendents.

As a result of these findings recommendations were made as to the training of craftsmen and technicians, the upgrading of in-service personnel, and the responsibility of development and coordination of training programs.

Order No. 73-17,193, 252 pages.

34: 675-A Aug '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Eide (Last name), Arvid (First name), Ray (Middle name)

Exact Title The Influence of Learning Packages and Independent Study on Student Achievement in Engineering Graphics

Degree granted Ph. D., Date 1973, No. of pages in report 149

Granted by Iowa State University (Name of institution) Ames, Iowa (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study was designed to investigate an alternate method of teaching graphics to freshman engineers at Iowa State University.

Conventional classes use a "lecture and problem" method that results in acceptable standards of student achievement, however, the possibility of improvements in student learning as well as attitude, attrition, motivation, and economy of operation always exists.

A series of twenty-five learning packages were developed, each consisting of an audio-video tape and a prepared module of instruction. These packages were designed so that individual students could control the amount of time needed to complete a unit. This technique resulted in a form of independent study that provided the student an added degree of freedom.

There were a total of 77 freshman engineers involved with approximately one-half being assigned to an experimental group and the other half being assigned to a control group.

The primary concern of this study was to determine if a difference in the amount of learning could be detected between the two teaching methods.

The criterion variables used to record appropriate data revealed that no significant difference was evident.

This analysis was followed by an in-depth study of different independent variables that might contribute to or correlate with one of the two teaching methods. A factorial study did not suggest that one method was better than the other in relation to the independent variables selected, however, it clearly indicated that high school rank and mathematic scores are good indications of achievement in graphics. A regression analysis also indicated that the amount of prior instruction in graphics the student had received was significant regarding course achievement.

A secondary but important result was the student attitudinal response. The favorable results of this survey, coupled with a very low attrition suggested that students had little objection to, in fact, would prefer a form of instructional methodology similar to that used in this study.

The economic considerations associated with this limited study were not conclusive but did suggest an improved faculty to student ratio with no loss in student motivation or achievement.

Order No. 73-25,219, 149 pages.
34: 2326-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Elkins, Richard, Lonsdale
(Last name) (First name) (Middle name)

Exact Title An Investigation of Selected Factors Associated with the Success of Freshmen Engineering Students at the University of Maryland

Degree granted Ph. D., Date 1972, No. of pages in report 183

Granted by University of Maryland College Park, Maryland
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study was conducted to obtain information about freshmen engineering students which could be used by persons counseling prospective engineering students. A series of profiles, consisting of academic and non-academic variables, were constructed and analyzed. These profiles were designed to show the similarities and differences between those students who dropped out of engineering at the end of or during their first year of college, and those who remained in the program for the start of their second year.

The profiles consisted of data from: the Scholastic Apitude Test (SAT); the Holland Vocational Preference Inventory (HVPI); the California Psychological Inventory (CPI); and each student's first semester and first year grade-point-average (GPA).

The difference between the mean score of the persisters and dropouts on each of the variables was tested for significance at the .05 level of confidence. For the SAT and the CPI, the means of the persisters and dropouts were tested with the mean score of all male freshmen at the University, in order to determine if differences existed.

In addition to the variables used for the profiles and corresponding analyses, a number of demographic factors obtained from the University Student Census (USC) and the students' records, were analyzed for differences between the persisters and dropouts. For each factor, a null hypothesis was stated and the difference between the two groups was tested using the chi square technique at the .05 level of confidence.

Based upon the results of the study, the following conclusions were drawn:

1. The verbal portion of the SAT was not able to discriminate between: persisters and dropouts: persisters and all male freshmen students; or dropouts and all male freshmen students.
2. The mathematical portion of the SAT was able to discriminate between: persisters and dropouts; persisters and all male freshmen students; and between dropouts and all male freshmen students. The persisters scored higher than the dropouts, and both the persisters and the dropouts scored higher than all male freshmen students on the SAT_M.
3. Both the first semester's and the first year's GPA of the persistors were significantly higher than those of the dropouts. The GPAs of students who left engineering after only one semester in college were significantly lower than GPAs of those students who remained in the program.
4. The HVPI was not able to discriminate between the persisters and the dropouts.
5. Seven scales of the CPI were able to discriminate between the persisters and dropouts. They were: (1) Sense of Well-being; (2) Responsibility; (3) Socialization; (4) Self-control; (5) Achievement via Conformance; (6) Achievement via Independence; and (7) Psychological-mindedness. Five of the CPI scales were able to discriminate between all male freshmen students and the persisters. They were: (1) Responsibility; (2) Socialization; (3) Self-control; (4) Tolerance; and (5) Achievement via Conformance. The Flexibility and Femininity scales of the CPI were the only ones capable of discriminating between the dropouts and all male freshmen students.

The results from the demographic data indicated that generally the persisters had a higher educational expectancy than did the dropouts; they tended to be more certain of their vocational goals; and percentage-wise, more of the persisters had studied mechanical drawing in high school. USC questions concerning when the student had made his decision to study engineering, where he resided during his freshman year of college, and the educational level of his mother and father failed to discriminate between the persisters and dropouts. The data from the USC also indicated that public school preparation as opposed to either private or parochial school training was somewhat indicative of persistence in engineering.

Order No. 72-29,351, 183 pages.

33: 2099-A Nov. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Erpelding, Lawrence, Henry
(Last name) (First name) (Middle name)

Exact Title Professional Education Competency Needs of Teachers of Vocational Technical Programs in Postsecondary Schools

Degree granted Ph. D., Date 1972, No. of pages in report 151

Granted by Kansas State University Manhattan, Kansas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The primary purpose of this study was to ascertain the professional education competency needs of postsecondary occupational education teachers in Kansas. The study was limited to 120 occupational education teachers in area vocational technical schools and community junior colleges in Kansas. The occupational areas represented were: agricultural education, business and office education, distributive education, health occupations, home economics, and trade and industrial education.

The study involved the identification of 45 professional education competencies considered useful and necessary for postsecondary occupational education teachers. A research instrument was developed to allow respondents to rate level of proficiency required, proficiency attained, and designate the type of educational setting where proficiency in the competency might best be attained.

Four hypotheses served as the basis for the study. They were:

1. There are no significant differences in the level of proficiency of selected professional education competencies considered to be necessary for success by postsecondary occupational education teachers in different occupational areas.

2. There are no significant differences in the level of proficiency of selected professional education competencies which the postsecondary occupational education teachers in different occupational areas considered themselves to possess.

3. There are no significant differences between the level of proficiency required and possessed for certain professional education competencies for each occupational area.

4. There are no significant differences among teachers in various occupational areas regarding their opinions of the type of educational setting in which each professional education competency may best be attained.

The Analysis of Variance technique was used to test Hypothesis One and Two. Tukey's multiple comparison procedure was used to determine the occupational areas between which significant differences for proficiency level required or attained existed. The level of significance was set at the .05 level. Hypothesis One was retained for 40 of the 45 professional education competencies. These findings suggested that there were a large number of similarities in the levels of proficiency related to the 45 professional education competencies required for success by postsecondary teachers in the six occupational areas. Hypothesis Two was retained for 25 of the 45 competencies.

The T-test for Related Samples was used to test Hypothesis Three. The level of significance was established at the .05 level. The data indicated agriculture teachers perceived a need for in-service education for 33 of the 45 professional education competencies. Thirty-nine significantly lower mean scores for proficiency possessed compared to the mean scores for proficiency attained were isolated for business and office education teachers; 19 for distributive education teachers; 20 for health occupations teachers; 40 for home economics teachers; and 15 for trade and industrial education teachers.

The Chi Square Test of Independence was used to test Hypothesis Four, and the level of significance was set at the .05 level. The study indicated that teachers among the six occupational areas agreed in most instances about the types of educational settings in which the 45 competencies could best be attained. Responses for ten competencies indicated significant disagreement between occupational areas. However, there was disagreement by teachers within each occupational area. The teachers as a group were often undecided whether certain competencies could most advantageously be attained in a comprehensive educational setting, comprehensive occupational area setting, or specific occupational area setting.

Recommendations were: teacher educators from various occupational areas should cooperate to serve the professional education competency needs of present and prospective postsecondary occupational education teachers; and State Department of Education staff should provide leadership and finances for the professional development of postsecondary occupational education teachers in the field.

Order No. 73-1161, 151 pages.
33: 3492-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Fahrlander (Last name), Daniel (First name), C. (Middle name)

Exact Title The Role of the Teacher in the Vocational Education and Practical Arts Laboratories

Degree granted Ed. D., Date 1973, No. of pages in report 102

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this research was to develop and test an instrument that would assist an individual to analyze teacher behavior in the vocational education and practical arts laboratories and to use the instrument to test two hypotheses regarding teacher behavior in the laboratory.

Forty observations were made in various high school laboratories in the development of the instrument. Ninety-seven observations were made with the completed instrument to test the hypotheses.

The instrument, which yields ten numbers that deal with ten characteristics of laboratory teacher behavior, is designed for visual contact only.

Hypotheses and Findings

To accomplish the objectiges of the study, a reliability and validity test of the instrument was conducted and the instrument was used to test the following specific hypotheses:

1. Teacher behavior does not vary significantly as a function of the amount of experience in the field of vocational and practical arts education.

To test this hypothesis, an analysis of variance technique was used with an F-ratio being computed to compare the means of the ten characteristics of teacher behavior of experienced teachers (three or more years of experience) with the means of these characteristics of relatively inexperienced teachers (less than three years of experience). Significant differences did not exist at the 0.05 level between the more and less experienced groups of any of the ten characteristics of behavior.

2. Student initiated activities do not vary significantly as a function of teacher behavior.

To test this hypothesis, a rank order correlation of activities was calculated. Teachers were placed in groups according to the amount of activity that involved them in the student work areas. This ranking was correlated with the numbers of student initiated activities that the teachers received. The rank order correlation was significant at the 0.05 level indicating that teachers who tended to remain out of the student work areas had significantly fewer student initiated activities than the other teachers. Order No. 73-13,293, 102 pages.

33: 6801-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Farning (Last name), Max (First name), Clarence (Middle name)

Exact Title Some Reasons Why so Few Black High School Graduates Attend Post-High School Area Vocational Schools

Degree granted Ph. D., Date 1972, No. of pages in report 180

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to determine why so few black male high school graduates in the Minneapolis-St. Paul, Minnesota, area attend post-high school area vocational schools. The investigator conducted personal interviews, over a four-month period, with black high school students and adults to develop hypotheses about why so few blacks attend area vocational schools. As a result of a literature review and the personal interviews, the investigator formulated 27 major hypotheses and 22 minor hypotheses.

In order to test these hypotheses, the investigator developed an instrument comprised of ten Likert-type scales and one true-false scale; a total of 259 items were formulated. A jury of 10 experts checked the instrument for content validity. The instrument was then pilot tested. For each scale, an item analysis was performed and internal consistency was checked. As the result of the validity check, pilot test, item analyses and internal consistency checks, 104 items were removed, leaving 155 items in the final instrument. The scales were developed to test for differences between groups of students on their perception of (a) labor unions, (b) area vocational schools, (c) blue collar work, (d) middle-class values, (e) their parents' perception of education, (f) their friends' perception of education, (g) the concept "education is good," (h) the concept "teachers are good," (i) the concept "counselors are good," and (j) their knowledge about area vocational schools.

The subjects were randomly selected from the population of male high school seniors attending two inner city high schools in St. Paul, Minnesota. There were two stratified random samplings: students were randomly selected within the parameters of race (black and white) and (a) what they *expected* to be doing the next year (attending an area vocational school, attending college, or having a full-time job), and (b) what they *would like* to be doing the next year (total N = 77). Analysis of variance, using orthogonal contrasts, was the principal statistical technique used. Limiting the discussion to significant differences (<.05 level), the major findings were as follows:

1. Within each of the two races, students who expected to be attending an area vocational school the next year scored significantly higher than students who did not expect to attend an area vocational school on each of the scales measuring their (a) perception of area vocational schools and (b) perception of blue collar work.
2. Within each of the two races, students who expected to attend school, either an area vocational school or a college, scored significantly higher than did students who did not plan to attend school the next year on the scale measuring their perception of reinforcement from their parents on school and educational activities.
3. Within the white race, students who expected to attend school the next year scored significantly higher than did students who did not expect to attend school the next year on each of the scales measuring (a) white middle-class values, (b) their perception of reinforcement from their friends on school and educational activities, and (c) the concept "education is good."
4. Within the black race, students who expected to attend an area vocational school the next year scored significantly higher than students who expected to have a full-time job the next year on the scale measuring knowledge of area vocational schools.
5. Between the races, the white students scored higher than the black students on the scales measuring their (a) perception of blue collar work, and (b) perception of area vocational schools.

Order No. 72-27,836, 180 pages.

33: 2250-A Nov '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Faurot (Last name), Lyle (First name), Martin (Middle name)

Exact Title An Investigation of the Validity of Vocational Student Grades as a Criterion of Vocational Student Success and the Predictability of Vocational Student Grades Using Standardized Test Instruments

Degree granted Ph. D., Date 1973, No. of pages in report 92

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

This study was carried out to investigate the relationships between grades of vocational students and various measures of vocational student success, and to investigate the predictability of vocational student grades using standardized test instruments. The study was done in the research setting of Project MINI-SCORE, a six-year research project at the University of Minnesota which investigated various measures of vocational student success to determine their usefulness to counselors.

Grades of vocational students in four curriculum areas from 1966 to 1968 were obtained from four of the Minnesota post high school vocational-technical institutes. The four curriculum areas were (1) Practical Nursing, (2) Secretarial Training, (3) Automotive, and (4) Mechanical Drafting and Design. For each curriculum area, correlations were calculated between GPA of students and the following measures which were available from Project MINI-SCORE.

(1) Whether they graduated or dropped from the program in which they were enrolled,

(2) Whether they became employed in a job related to training or were either unemployed or employed in a job unrelated to training one year after graduation,

(3) Whether they became employed in a job related to training one year after graduation or dropped from the training program (a measure defined in Project MINI-SCORE which seemed to represent the maximum difference obtainable in the sample studied between desirable and undesirable products of vocational programs),

(4) The satisfaction of the employed graduates as measured by the Minnesota Satisfaction Questionnaire one year after graduation, and

(5) The satisfactoriness of the performance of the employed graduates as measured by the Minnesota Satisfactoriness Scales one year after graduation.

Grades were found to be significantly related to measures (1) grad vs. drop and (3) employed-related vs. drop listed above for both males and females, but unrelated to the other three measures.

Both zero-order and multiple correlation coefficients were calculated between the scales of the various Project MINI-SCORE standardized test instruments and GPA of vocational students. These instruments were: (1) the General Aptitude Test Battery (form B) written portion only, (2) the Minnesota Vocational Interest Inventory, (3) the Sixteen Personality Factor Questionnaire (form C), (4) the Minnesota Importance Questionnaire (30-scale version), (5) the Vocational Development Inventory, and (6) the Minnesota Scholastic Aptitude Test.

The GATB scales were found to be the most effective predictors of grades of vocational students. Three of the GATB scales were significantly related to grades in the male curricula and four scales for the female curricula. The multiple correlations were significant for both male and female curricula.

Two of the MVII scales were predictive of grades in the male curricula.

One of the MIQ scales was predictive of grades for the female curricula.

None of the other scales or instruments were predictive of the grades of vocational students.

The findings of the study support the use of grades as a measure of training success, but not as a measure of employment success.

The predictability of grades in the sample studied seems to be limited to measures of aptitudes and interests (GATB and MVII). The other instruments used in this study seemed relatively ineffective in predicting grades of vocational students.

Order No. 73-18,162, 92 pages.

34: 676-A Aug 73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Fetterman (Last name), Elkie (First name), Ruth Blumenthal (Middle name)

Exact Title The Development of a Work Orientation Program For Home Economics Related Occupations

Degree granted Ph. D., Date 1966, No. of pages in report 129

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Statement of the Problem. The purpose of this study was to develop a work orientation program for home economics related occupations. The problem was treated under these main divisions:

1. Identification of occupational areas related to home economics located in Connecticut;
2. Investigation of existing work orientation programs in home economics related occupations in the United States, Puerto Rico, and the Virgin Islands;
3. Recommendation of regional pilot centers for developing work orientation programs for home economics related occupations in Connecticut.

Procedure. Letters were sent to all state supervisors of home economics education in the United States, Puerto Rico, and the Virgin Islands for names and addresses of teachers who conducted work orientation programs for home economics related occupations. The five state supervisors who did not respond received personal telephone calls from the investigator to make the responses one hundred per cent from the state supervisors.

Questionnaires were sent to forty-three teachers of secondary school work orientation programs for home economics related occupations in the United States. After follow-up letters and telephone calls to those who had not responded, a total of forty-three or one hundred per cent, were returned.

In addition to the questionnaire, a total of twenty interviews were held with Connecticut State Employment Service managers in order to determine available job opportunities in home economics related occupations.

Socioeconomic index scores for the one hundred sixty-nine communities in Connecticut were ranked and then averaged for each labor market area in the state.

Home Economics teachers in federally aided departments in Connecticut were asked to rank objectives of work orientation programs according to the priority as they perceived them.

Summary. A summary of this study including a review of the literature, information received from the questionnaires and personal interviews, revealed that one hundred per cent of the Connecticut home economics teachers in this study would consider the development of a work orientation program in home economics related occupations worthwhile. High school home economics courses are an asset to job attainment.

In 1962 two and one-half million salespersons were employed in close to one hundred kinds of retail businesses in the United States. The number of babysitters (child monitors) reported employed in 1960 was 327,781. This represented a growth of three hundred sixty-seven and four-tenths per cent from 1950 to 1960. More than one and two-tenths million men and women were employed in the apparel industry in early 1963. Two million people worked in establishments serving food in 1960.

Clusters of jobs existing in Connecticut in home economics related occupations are: food service, 1708; private household, 2990; clothing related, 2011; sales, 1279. The total number of job opportunities in home economics related occupations in Connecticut on file in Connecticut employment offices is almost eight thousand.

Seven of the labor market areas in the state showed a close relationship between the number of job opportunities and socioeconomic index scores. For these seven labor market areas, the higher their socioeconomic index average, the more openings existed in home economics related occupations.

Conclusions. The large number of persons employed in home economics related occupations and the employment outlook for these positions justifies the development of a work orientation program for home economics related occupations in Connecticut. Home economics content should be utilized to help prepare individuals for employment as well as homemaking.

Home economics teachers need to be more realistic in their instruction and explore the kinds of work that individuals can and will do within the geographical area of employment of their graduates. Necessary for the development of the program is cooperation with public employment service personnel who have occupational information continuously available regarding reasonable present and future prospects for employment in the community and elsewhere. Assurance of placement after completing the program is necessary for the success of the program.

The development of a work orientation program for home economics related occupations in Connecticut would be principally concerned with the recognition of realities and values regarding our society.

Although the beginning positions are the initiating experiences for the majority of students, the work orientation program should be concerned with advancement opportunities as well as entry level jobs. Additional training beyond high school is necessary for advancement to higher levels of employment. Microfilm $3.00; Xerography $6.20. 129 pages.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Fields (Last name), Owen (First name), Franklin (Middle name)

Exact Title A Comparison of Students' Reading Abilities, the Readability of Textbooks, and Students' Attitudes Toward Textbooks in Seven Areas of Vocational Eucation in a Western Pennsylvania Area Vocational-Technical School

Degree granted Ed. D., Date 1972, No. of pages in report 158

Granted by University of Pittsburgh (Name of institution) Pittsburg, Pennsylvania (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to compare the readability levels of the textbooks used in seven areas of high school vocational education in a western Pennsylvania area vocational-technical school with the reading abilities of the students using the textbooks and to assess students' attitudes toward their vocational textbooks. The seven areas of vocational education studied were Automobile Mechanics, Business Education, Cosmetology, Data Processing, Distributive Education, Machine Shop, and Welding.

The Dale-Chall Readability Formula was used to ascertain the grade placements of nineteen textbooks used in the seven vocational areas, and the Nelson-Denny Reading Test was used to measure the reading abilities of the students. A Likert-type attitude scale was developed to assess students' attitudes toward principal vocational textbooks. Intelligence quotients were determined through the use of the Lorge-Thorndike Intelligence Test, Level 5, Nonverbal Battery.

High-school level students and textbooks from a large western Pennsylvania area vocational-technical school were used in the study. The students represented all levels of academic achievement and were of lower class and lower middle-class socio-economic backgrounds.

Direct comparisons between textbooks' grade placements and students' grade-level reading abilities revealed that of nineteen vocational textbooks analyzed by the Dale-Chall Readability Formula, eighteen had grade placements above the reading abilities of 50 to 100 percent of the students using them.

Hypotheses regarding textbooks' readability levels, students' reading abilities, students' intelligence quotients, and students' attitudes toward principal vocational textbooks were tested using the following statistical procedures: One-way analysis of variance, Pearson product-moment correlation, and Spearman rank-order correlation. The statistical analyses led to the following conclusions:

Marked differences in reading difficulty existed among the nineteen vocational textbooks analyzed by the Dale-Chall Readability Formula.

The reading difficulty of textbooks differed significantly in four of five vocational areas using multiple textbooks.

There were no significant differences in mean reading difficulty of textbooks used among the seven vocational areas.

There were significant differences in students' reading abilities and students' intelligence quotients among the seven vocational areas.

Although there were significant differences in mean attitude scores among the seven vocational areas, the attitude scores within areas of students reading above, equal to, or below the readability levels of their principal vocational textbooks did not differ significantly.

There were no significant relationships between students' attitudes toward principal vocational textbooks and students' reading abilities or between students' attitudes toward principal vocational textbooks and students' intelligence quotients.

There was no significant relationship between the ranks of the seven vocational areas in terms of mean reading difficulty of textbooks used and mean reading ability of students in the areas.

There were no significant differences in mean reading ability levels of students among the four school districts sending students to the area vocational-technical school.

Order No. 73-13,228, 158 pages.
33: 6801-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Finkral, Keith, Charles
(Last name) (First name) (Middle name)

Exact Title Relationship of Self-Concept and Perfromance of a Finely Coordinated Motor Task

Degree granted Ph. D., Date 1972, No. of pages in report 111

Granted by Purdue University Lafayette, Indiana
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to determine if a relationship exists between self-concept and the performance of a finely coordinated psychomotor task. Also of interest was the type and magnitude of the identified relationships.

Intact groups of college students from three welding classes were subjected to one of two specific experimental treatments: a supportive set of directions for performing a welding task (N=49), and a repressive set of directions for performing the same welding task (N=48). The welding task was utilized as a psychomotor task requiring hand-eye coordination. Both arc and gas methods of welding were used in this study.

The Tennessee Self Concept Scale was used to determine the overall self-concept of each of the subjects. On the basis of the "total positive" score, each subject was assigned to one of three levels of self-concept (high, average, or low). The criterion scores which served as the dependent variable in this experiment consisted of tensile strength scores of a welding specimen in one analysis and the number of attempts of the task by each subject in another analysis. Each subject responded to a pre-task and a post-task question. A discrepancy score was obtained by subtracting the pre-task response from the post-task response. The difference in mean discrepancy scores between treatment groups was tested for statistical significance.

An unweighted means analysis of variance was used in the analysis of tensile strength scores and number of attempts in a 2 x 3 factorial design. A t test was used to test for significant difference in the mean discrepancy scores between treatment groups.

All research hypotheses were tested at the .05 level of statistical significance. The following results were obtained: 1. There was no significant difference in the mean performance of the welding task among the three levels of self-concept. 2. There was no significant difference in the mean performance of the welding task between the two treatment groups. 3. There was no significant interaction between treatments and levels of self-concept when mean performance was used as the criterion. 4. There was no significant difference in the mean number of attempts among the three levels of self-concept. 5. There was no significant difference in the mean number of attempts between the two treatment groups. 6. There was no significant interaction between treatments and levels of self-concept when number of arc welding attempts was analyzed. There was a significant interaction between treatments and levels of self-concept when the number of gas welding attempts was analyzed (p .05). 7. There was no significant difference in discrepancy scores between the two treatment groups.

The only statistically significant finding occurred as the interaction between the supportive treatment group and the self-concept levels. Various limitations of this experiment may have restricted the number of statistically significant differences that were identified. The treatment that was used in this experiment appeared to be less effective than the researcher anticipated. In addition, it is possible that several variables in the design of the experiment were not adequately controlled, causing the resulting data to be affected by factors other than the treatment. Research concerning the self-concept psychomotor performance relationship is in its infancy. The findings of this study may, however, be of value in guiding future research in this area. Order No. 73-6021, 111 pages.

(33: 4905-A) March '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Fisher, Allyn, Johnston
(Last name) (First name) (Middle name)

Exact Title The All India Handicrafts Board and the Development of Handicrafts in India.

Degree granted Ph. D., Date 1972, No. of pages in report 281

Granted by Syracuse University Syracuse, New York
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This dissertation attempts to describe and evaluate the role of the All India Handicrafts Board and various state agencies involved in the development of handicrafts in India. The Introduction describes the origins, structure, and organization of the Board. It also points out that since handicrafts are a state regulated subject, the role of the Board is mainly advisory, attempting to show (by example) and persuade the states to undertake activities that will benefit crafts and craftsmen.

Chapter I describes one of the major achievements of the Board: the vast expansion of the domestic market for handicrafts. The various promotional activities of the Board are described, but the main section is devoted to an analysis of three state-run marketing organizations--those of Rajesthan, Jammu and Kashmir, and Mysore. The background, purchase and payment policy, and the quality of stock in each are examined and evaluated. It was found that despite official policy to the contrary, state emporia are not buying goods from the small, independent craftsman. This leaves these craftsmen, economically weak and thus vulnerable to exploitation by dealers, no alternative marketing outlet to these dealers. The quality of stock in two of the three states' emporia are also found to be disappointing.

Chapter II evaluates the Board's effectiveness in promoting exports and in maintaining quality control over such exports. Even though perhaps 97 percent of handicrafts exporting is done by private dealers, the Board has been both an aid and a hindrance in furthering these exports. It is shown also that the Board has failed to persuade either state emporia or private dealers to insure strict quality control in exported handicrafts. The result has been the export of much substandard material.

Chapter III discusses the successful efforts of the Board to revive and stimulate the crafts, and to give greater recognition to master craftsmen. The latter had been achieved in part through the Board's National Award program and the former through its various training schemes and pilot development centers.

In Chapter IV, two specialized pilot organizations run directly by the Board--the Central Handicrafts Development Centre, Bangalore, and the Regional Design Centres in Bangalore and Delhi--are evaluated. It is suggested here that while much good technical, developmental, and design work is being done by these centres, their main value may lie in their providing "state patronage," in the absence of the old "Maharaja's court," to some of India's best handicrafts artisans.

Chapter V discusses two further "failures" of the Board--its inability to effect a more liberal flow of credit to small craftsmen, and the decline of the handicrafts co-operative movement despite continued official proclamations supporting the co-operative idea. The failure of the co-operative movement, the reluctance of the state emporia to make the effort to purchase directly from small craftsmen, and the failure of the Board to obtain easy credit for this type of craftsman, suggests a bleak future for India's cottage-type craftsmen.

In the Conclusion it is suggested that the Board's policies of emphasizing the development of export potential crafts (to the exclusion of others) is skewing the normal development of the crafts. One result of this skewing is that more and more previously independent, cottage-type, craftsmen are finding it necessary to find work in craft karkhanas as wage earners, since they can no longer compete with the karkhanas as independent craftsmen. Order No. 73-9519, 281 pages.

33: 5836-A April '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author	Fluegge,	Lynn,	Roy
	(Last name)	(First name)	(Middle name)

Exact Title Pupillographic Study: Relationship Between Vocationally Oriented Stimuli and Selected Ovis Scale Scores.

Degree granted Ph. D., Date 1972, No. of pages in report 94

Granted by Purdue University Lafayette, Indiana
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The pupil of the eye responds to changes in the autonomic nervous system which can occur as the result of emotional arousal, caused by viewing pictures. Measurements of the pupillary responses to the pictures reflect interests of the individual at the subconscious level which are free of many of the biases inherent in paper and pencil interest inventories which measure at the conscious level.

This study was undertaken to determine if pupillary responses to various vocationally oriented visual stimuli would show a relationship, either positive or negative, between the stimuli and the Crafts and Precise Operations scale and the Musical scale of the Ohio Vocational Interest Survey.

The stimuli consisted of black and white pictures of five occupations implied by each of the two OVIS scales used. The stimuli depicted: welder, carpenter, business machine repairman, professional engineer, automobile mechanic, composer, vocalist, film editor, instrument repairman, and music teacher.

The stimuli were presented on super 8 closed-loop film cartridges. Each stimulus was preceded by a blank screen which had the same overall brightness as the stimuli picture. The measurement was the difference in the stimulus harmonic mean and the blank harmonic mean.

Pupillary responses were recorded at predetermined intervals as subjects viewed the screen. Responses were enlarged twenty-three times the size of the film and measured.

A ten by ten Latin square design was utilized to display the stimuli to the thirty subjects, fifteen male and fifteen female, selected to view the stimuli. Three subjects viewed each of the ten film loops. No instructions were given which would indicate the specific jobs depicted in the film.

Four multiple linear regression analyses were performed to determine if any significant relationships existed between pupillary responses to the stimuli and the subject's raw scores on the two OVIS scales. One of the analyses resulted in no significant relationship. However, there was varying amount of pupillary responses to the presented stimuli. Significant relationships were found to exist between the pupillary responses to the ten stimuli and the subject's raw scores on the two OVIS scales used.

Factors which may have influenced the outcomes of the analyses were discussed, and the following recommendations for future research were indicated: 1. develop and validate a set of occupational stimuli for a specific occupation; 2. use other interest measures as criterion scores; and 3. use motion pictures and/or color instead of black and white still pictures as stimuli. Order No. 73-6023, 94 pages.

(33: 5053-A) March '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Freeze (Last name), Samuel (First name), Joseph (Middle name)

Exact Title The Development of a Slide-Tape-Booklet Program for Orienting Teachers to the Illinois Three Phase System for the Statewide Evaluation of Occupational Education Programs

Degree granted Ph. D., Date 1973, No. of pages in report 108

Granted by Southern Illinois University (Name of institution) Carbondale, Illinois (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

A complete understanding of this study is impossible without a knowledge of the Three Phase System for Occupational Program Evaluation. Information on this may be obtained from the Program Approval and Evaluation Unit of the Illinois Division of Vocational and Technical Education.

The purpose of the study was to develop a slide-tape-booklet teacher orientation program to present the Three Phase System for Occupational Program Evaluation, and then experimentally compare it with a conventional verbal method of orientation. The two presentation methods were compared as to their tendency to develop a positive attitude within the teachers, whose occupational education programs were about to be evaluated, concerning program evaluation in general and the Three Phase System in particular.

The slide-tape-booklet orientation program was undertaken pursuant to a contractual agreement with the Illinois Board of Vocational Education and Rehabilitation, Division of Vocational and Technical Education. The technical aspects of the development of the program were accomplished through the cooperation of the Learning Resources Center at Southern Illinois University. This program was developed during the summer of 1971.

Upon completion of the orientation program development, the following procedure was followed: (1) identification of participating schools, (2) administration of pre-test forms, (3) conducting of both the verbal and slide-tape-booklet orientations, (4) administration of post-test forms, (5) identification of team member subjects, (6) administration of team member questionnaire, and (7) analysis of the data.

A test was developed to measure the teachers' attitudes toward program evaluation in general and toward the Three Phase System in particular. The test consisted of twenty-two items to which the teachers were asked to respond along a five-point strongly agree to strongly disagree scale. The same test was administered as a pre-test and post-test.

A total of 112 teachers responded to the pre-test forms and 115 teachers responded to the post-test forms. These teachers represented five vocational school districts in Illinois.

Eight persons were subjected to the team member questionnaire. These persons were selected because they had served on evaluation teams where both types of orientation programs were used.

The means for the pre-tests, post-tests, and gains were analyzed to determine which of the two orientation methods produced the most significant changes in attitudes among the teachers. The responses received to the open-ended question contained on the post-test were categorized under three captions: no comment, postive, and negative. These responses were then analyzed by comparing the percentages of responses for each of the classifications for each of the two orientation methods.

The data gathered by the team member questionnaire was analyzed by determining the percentages of responses to each of the two objective questions asked and summarizing the responses to the open-ended question asked.

The following conclusions were made with respect to the identified limitations of the research:

1. Analysis of the data led to the acceptance of the following null hypothesis: there is no significant difference in attitude change concerning program evaluation in general between teachers given a verbal orientation to the Three Phase System and those given a slide-tape-booklet orientation.
2. The following null hypothesis was also accepted: there is no significant difference in attitude change concerning the Three Phase System between teachers given a verbal orientation to the Three Phase System and those given a slide-tape-booklet orientation.
3. Analysis of the data received from the evaluation team members led to the guarded rejection of the following null hypothesis: there is no significant difference in the effectiveness of the two orientation methods as indicated by selected visitation team members.

The findings relevant to hypothesis three indicated that a majority (4 out of 6) of the team members felt that the slide-tape-booklet orientation method was superior to the verbal method if a sufficient question-answer session followed.

Order No. 73-23,688, 108 pages.

34: 1785-A Oct '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Froese, Richard, Albert
(Last name) (First name) (Middle name)

Exact Title Guidelines for the Maintenance of Industrial Education Equipment

Degree granted Ed. D., **Date** 1972, **No. of pages in report** 129

Granted by Arizona State University Tempe, Arizona
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to develop guidelines to be used by school districts in establishing maintenance programs for instructional equipment in industrial education. In vocational and pre-vocational type industrial education classes, instructional equipment is the backbone of the curriculum. Students and teachers alike depend on operable equipment in order to learn and demonstrate the varied and complicated skills that are needed to become employable as well as to explore the skills in a variety of occupations.

Procedure and Methods

A survey-questionnaire was administered to ten school districts in Arizona and southern California meeting the criteria of having at least five thousand secondary school students and offering a program in industrial arts and/or trade and industrial education. All five school districts in Arizona meeting the criteria were used in the survey. The five districts from southern California were randomly selected through the use of a table of random numbers. The results of the survey formed the basis of a set of tentative guidelines that were sent to a panel of experts for review and reactions. The panel of experts was randomly selected from a list prepared by the Division of Technology, Arizona State University, and the Division of Vocational Education, Arizona State Department of Education.

After an analysis of these reactions, together with the data gathered from the survey, the final guidelines were developed.

Guidelines

The guidelines covered the development of district policy that included (1) maintenance responsibility, (2) record keeping, (3) maintenance program, (4) equipment, and (5) service contracts. The first major area includes the responsibilities of the instructor, students, and district maintenance personnel. Details of the responsibilities of all those concerned were parts of this major area.

An emphasis was placed on the need for accurate and up-to-date records and the recommended use of data processing equipment where possible. Some of the highlights of the guidelines referring to the maintenance program included the regular inspection and evaluation of instructional equipment along with the development of a preventive maintenance program.

In relation to equipment, the factors determining depreciation were listed and an analysis of the need for replacement versus the repair of equipment was considered, along with the selection and purchase of equipment. Service contracts were recommended for consideration wherever possible to provide sufficient teaching time for the instructor.

Recommendations

Among the recommendations were the following:

1. School districts as represented by the respondents of the survey-questionnaire should utilize the guidelines for the establishment of maintenance programs for industrial education equipment.
2. In-service training programs should be developed in conjunction with universities and commercial equipment producers on the maintenance of industrial education equipment.
3. An inspection of equipment process should be developed to assess all pieces of equipment on a regular schedule.
4. Research should be conducted into the advantages and disadvantages of a district maintenance program versus one established and conducted by an outside vendor or contractor.
5. Research is needed regarding the comparison of the utilization and life of equipment used in industrial education versus comparable equipment used in private industry.
6. Research should be conducted in the gathering of data necessary to establish life expectancy tables for equipment used in industrial education shops.

It would be wise for any school district utilizing the guidelines in the development of their own maintenance program for industrial education equipment to continually review the program and procedures so that the most effective and economical instructional program can be conducted.

Order No. 72-30,363, 129 pages.

33: 2016-A Nov. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Fullen (Last name), James (First name), Delbert (Middle name)

Exact Title Perceptions of the Language Arts Education in the Ohio Two-Year Technical College Programs

Degree granted Ph. D., Date 1973, No. of pages in report 173

Granted by The Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The problem that this study attempted to answer was: What is the identity of the language arts program in Ohio two-year colleges with technical programs. Technological demands, social pressure for improved instruction in education, findings of earlier studies, and lack of data concerning this problem contributed to the need for such a study. An appraisal of existing programs and of administrator, employer, instructor, and student perceptions was necessary before one could identify both present and potential language arts programs and recommend action and change.

The research procedures involved (1) a survey of the literature to gain background and direction; (2) development of items for the four questionnaires which would reveal the identity of the technical language arts program and the perceptions of the educational administrators, language arts instructors, technical students, and employers of technical graduates; (3) administering the two larger questionnaires in a pilot study; (4) refining the items; (5) mailing the questionnaires and requests, cover letters, and return envelopes to 46 Ohio two-year colleges, 60 employers, 60 students, and 91 California two-year colleges; (6) coding the returns and transferring numbers through key-punch processing to IBM cards; (7) computer programming; (8) statistical treatment and analysis of data; and (9) presenting the data in tabular and graphic form.

The major conclusions drawn from the study were as follows:

1. The Ohio colleges and universities ill equipped administrators and instructors for work in the two-year technical colleges.

2. There was a dearth of suitable textbooks that fit well the economy of the technical student and the needs of the two-year technical language arts programs.

3. The inability of the colleges and universities to train administrators and instructors well and the dearth of suitable textbooks were attributable to the lack of the language arts program of the two-year technical colleges to possess an identity.

4. There was no Ohio technical language arts program. The Ohio technical language arts program was not a program, but various programs. These programs lacked individuality: They copied much of the four-year college program. These programs lacked sameness: They differed greatly from each other.

5. Individually and collectively, the Ohio and the California two-year technical college language arts programs differed significantly.

6. Although most persons involved in or with the technical language arts programs felt that the program should differ from that of the four-year college and teach the basic communicative skills for the preparation of the technical students for work, the Ohio and the California two-year technical colleges practiced an English composition and speech curriculum.

7. Although there was great dissatisfaction, disagreement and constant changing within the current language arts programs, the individual college programs were perceived by the employers and students to be adequately successful.

8. The language arts programs were recognized as a vital part of technical education; there was a great interest in the quality of the language arts programs in the two-year technical colleges of Ohio; however, the technical language arts programs received little employer support and only fair student support. There were no direct lines of communication between the employers and the language arts instructors.

9. There was a great awareness of the role and the purpose of the language arts programs on the part of most technical education administrators.

10. Yet, the administrators made the final language arts curriculum decisions; this demonstrated the lack of such awareness.

11. There was, though, substantial tenure among language arts faculties of the Ohio two-year technical colleges.

12. The "teach not research" slogan of the two-year technical colleges needed abandoning. Obviously, there was great need for further studies: for example, (1) the establishment of a technical language arts program identity, (2) textbook and graduate school guidance, (3) improvement of transferability of language arts course credits, (4) the reason for poor employer support, (5) establishment of direct lines of communication between industry and the language arts instructors.

The study recommended establishing a state organization and publishing a professional journal for language arts instructors. Order No. 73-26,817, 173 pages.

34: 2329-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Garner (Last name), Melvin (First name), Hood (Middle name)

Exact Title A Cost Analysis of Vocational Education Programs in Maryland

Degree granted Ed. D., Date 1972, No. of pages in report 160

Granted by Temple University (Name of institution) Philadelphia, Pennsylvania (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

This is a study of the attributable costs of selected vocational programs in Maryland. The costs of the programs were determined by actual total expenditures attributable to specific programs of vocational education. The study was also concerned with identifying and determining actual expenditures attributable but not reported and/or not charged to vocational education.

The purposes of the study were to: (1) determine the total actual attributable expenditures for specific programs of vocational education for one fiscal year; (2) develop a systematic procedure that would enable a local educational agency to account for total actual expenditures attributable to specific programs of vocational education; and (3) determine the relative costs of selected vocational education programs in area vocational schools.

This study was limited to vocational programs in those schools in Maryland that: (1) were designated as area vocational schools; (2) utilized construction funds under the Vocational Education Act of 1963; (3) were in operation for at least one full year; and (4) were representative of six regional areas of the State.

The schools selected for the study included three vocational-technical centers and three comprehensive schools with area vocational schools attached. A total of ninety-one specific vocational programs operated within the six area vocational schools.

A tentative list of identified costs was submitted to a panel of experts for their consensus as to the proper inclusion of those costs that are attributable to vocational education programs. The panelists indicated that all items of expenditure should be considered attributable.

The study was conducted by personal examination, recording, and analysis of the various reports and records maintained by the Maryland State Department of Education, the local boards of education, and the area vocational schools included in the study. All actual expenditures of funds by the local boards of education were collected for inclusion in the study. Financial data was summarized by program and expenditure classification and entered on a financial status form which permitted comparison between reported expenditures and actual expenditures and between vocational centers and comprehensive schools.

All expenditures made were for items included in the list of identified attributable expenditures. For every federal dollar expended for vocational education there were $17.50 of state and local funds expended. Federal funds represented 5.4 per cent and state and local funds represented 94.6 per cent of the total expenditures.

Direct costs, those directly attributable to vocational education programs, represented 55.5 per cent and indirect costs, those that require proration, represented 44.5 per cent of the total expenditures. Of the total actual expenditure 80.5 per cent was not charged to vocational education. The reported expenditures from the six school districts ranged from 6.7 per cent to 47.4 per cent of the total actual expenditures.

When all expenditures attributable to vocational education were compared, the costs of vocational education at vocational centers represented 57.6 per cent and comprehensive schools 42.4 per cent of the total actual expenditures. When indirect costs were excluded expenditures for the vocational centers represented 48.3 per cent versus 51.7 per cent for comprehensive schools.

Total program expenditure reduced to cost per clock hour is the most significant unit for predicting the operational costs of vocational education programs.

A procedure for coding items of expenditure for purposes of identifying those expenditures and fund sources attributable to vocational education is recommended.

Order No. 72-27,182, 160 pages.

33: 1602-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Gauthier (Last name), Michael (First name), Kent (Middle name)

Exact Title Instrumentation Technology: A Curriculum Study

Degree granted Ed. D., Date 1972, No. of pages in report 176

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to document and summarize the curriculum practices in instrumentation technology in the United States in 1971 and to document industry's requirements for a fresh-out-school instrumentation technician.

Ninety-one junior colleges and technical institutes were surveyed, and it was found that only 31 currently have a two-year instrumentation curriculum. The curricula of these schools were evaluated and reported.

Industry's responses were recorded on a special questionnaire developed for this research project. The questionnaire established the type of engineer or scientist responding, as well as his ideas, attitudes, and the requirements for the education and skills needed by a technician entering the field of instrumentation technology. These data were analyzed and related to the college curricula. The questionnaire was circulated to a wide range of engineers and scientists so as to reach into all phases of instrumentation; 525 questionnaires were analyzed during the survey.

Besided identifying all colleges and technical institutions that offer a two-year instrumentation technology curriculum, a complete listing was made that gave the name and location of each institution, the number of graduates in June 1971, the total student enrollment as of June 1971, the curriculum outlines, and the type of award given upon completion of the curriculum.

The responses to industry's questionnaire are listed in detail, along with a two-dimensional graphic display for an in-depth analysis of the results.

Based on the material gathered, a suggested instrumentation technology curriculum was developed. This is included in addition to recommended course outlines, and other information compiled during the time of this study.

Order No. 72-25,770, 176 pages.

33: 1603-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Gillaspy (Last name), Roy (First name), Eugene (Middle name)

Exact Title Effectiveness of Existing Eye Safety Legislation in Arizona

Degree granted Ed. D., Date 1973 No. of pages in report 94

Granted by Arizona State University (Name of institution) Tempe, Arizona (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

PURPOSE OF THE STUDY

The purpose of this study was: (1) to ascertain the current practices of eye safety in Arizona high school vocational, technical, and industrial arts laboratories, (2) to ascertain who enforces the eye legislation within the local districts, (3) to ascertain the means of furnishing eye protection devices to users, (4) to ascertain who selects the eye ware for the school, (5) to ascertain who is responsible for determining that the eye ware meets the American Standards Institute specifications, (6) to ascertain if, and how, eye protective devices are disinfected, and finally, (7) to ascertain the teachers' interpretation of the existing eye legislation.

PROCEDURES

The literature and research with respect to eye safety legislation and eye accidents in other states was reviewed. Data collection was accomplished by means of a personal interview and observation accompanied by a checklist questionnaire. The personal interview was conducted at the randomly selected school in the laboratory taught by the industrial educator being interviewed. The interviews were conducted during class time and without advanced notice to the school or teacher.

The population of this study included fifty-one percent of the high schools in Arizona that offered industrial education in their curricula. The population was selected from the 1970-1971 Arizona Industrial Arts Directory published by the Arizona Department of Education, Division of Vocational Education.

In every school, the writer interviewed the department chairman or the person responsible for the industrial education classes.

FINDINGS

1. Some teachers interpret the eye safety legislation to be more conclusive than others by making all students wear eye protective devices as soon as they enter the laboratory area, while others make them wear them when engaged in an activity requiring eye ware by law.

2. A limited number of schools were aware of the safety officer requirements in the legislation and had appointed an officer when the law became effective, but did not actively follow-up on the assignment.

3. The majority of the schools furnished eye protective devices to the students for use during that particular period or activity.

4. Teachers indicated that the selection of the eye protective devices was made by a committee consisting of an administrator, department heads, and teachers.

5. The school administrators and teachers alike did not know the standards set by the American National Standards Institute.

6. The teachers in the larger districts used the infrared lamp for disinfecting which was usually mounted in the storage cabinet that housed the eye ware. The smaller schools relied on Germacide, warm water and a detergent, and did not clean them as often.

7. The larger school districts were equipped with more eye safety devices and better sanitizing facilities. They also had a better replacement policy and reported less trouble in getting replacements.

8. All teachers reported that visitors were to abide by the eye safety rules and regulations, and the majority said that they enforced these rules. Yet, this writer was asked only one time when visiting 117 teachers to wear eye protective ware while visiting the laboratories.

9. The teachers were unsure of the proper interpretation of the eye safety legislation. Teachers within the same schools did not always agree on the interpretation.

10. In general, the smaller schools felt they did not have the same quality of safety equipment as the larger schools and would like to see one type of safety device become accepted for eye ware and face shields.

11. The teachers agreed in the need of eye safety legislation and, as a whole, are abiding by the law but feel the need for a clearer interpretation, which would be helpful for the administrator, teacher, and student. Order No. 73-12,084, 94 pages.

33: 6247-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Goss (Last name), Anthony (First name), John (Middle name)

Exact Title The Effectiveness of the Colleges of Applied Arts and Technology of Ontario. (Volumes I-III)

Degree granted Ph. D., Date 1972 No. of pages in report 504

Granted by State University of New York (Name of institution) Buffalo, New York (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of Study:

In the mid nineteen-sixties legislation was passed setting up a system of twenty community colleges in Ontario. They were established to meet the considered economic and social needs of the people of the Province. It was believed that increased post-secondary educational facilities of a basically vocational nature would provide technically competent personnel to meet the rapidly expanding needs of the Province.

The new colleges were not designed to be merely trade schools. Curricula in the various programs were expected to contain courses of a broadening nature although the major emphasis was still to have been upon courses that trained students for some form of occupation. The course offerings were not designed to approximate university courses, and no attempt was made to institute programs which would lead to advanced university credit.

The colleges have now been in operation for five years, and it is time that the government's policy with regard to the colleges, be examined, to ascertain how effective those policies have been. In order to do this, three representative colleges were selected for study, Niagara College, Sir Sandford Fleming College, and Mohawk College. Questionnaires were sent to three classes of respondent: graduates, persons who should have graduated but did not, and employers. Each group was invited to answer different sets of questions which were designed to indicate the effectiveness of the training that college students were receiving. Other questions were included to discover whether the education that the students had received was considered by them to be satisfactory, what their attitudes were with regard to the question of articulation, and whether the colleges were properly serving local industrial needs, as they had been designed to do.

A reasonably good response to the questionnaires enabled meaninful analysis to be undertaken. The results were tabulated and then used to answer the questions that were posed. Only a small number of employer returns were sent out and received so that valuable information as to employer attitudes was recorded, but the data cannot be considered nearly as conclusive as that generated by the graduate responses.

It was clear that the college graduates to a large extent were satisfied with the education and training they had received at the Colleges of Applied Arts and Technology of Ontario. The employers also indicated that they were satisfied with the quality of the college graduates that they had hired. Nevertheless it was discouraging to find that within two years of graduation more than half the graduates had not worked in the fields for which they had trained. Such a discovery calls into question the government policy of narrow specialization in programs where there is little available work.

On the question of university transfer, the graduates were clearly divided. However it was obvious that the government's policy of not catering to educational mobility between college and university had created frustration and bitterness in a sizeable number of graduates. It has become obvious that the provincial government will need to modify its policy on this question.

There can be no doubt that the colleges have been, by and large, successful in meeting the needs of both the student population and local business. It would be unfair to expect perfection so that the recommendations for improvement should not be allowed to hide the undoubted success of the government's college policies. Order No. 73-5110, 504 pages.

(33: 4672-A) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Grantham, Lawrence, Bertram
(Last name) (First name) (Middle name)

Exact Title Differential Effects of Classroom Behavior Management And Traditional Teaching Techniques on Vocational Knowledge and Attitudes at Fifth and Sixth Grade Levels

Degree granted Ph. D., Date 1972, No. of pages in report 116

Granted by University of Southerm Mississippi Hattiesburg, Mississippi
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The problem was to determine the differential effects, if any, the Classroom Behavior Management approach and the Traditional Classroom Teaching approach had on attitudes and subject matter knowledge in the presentation of lessons in career development at the fifth-grade and sixth-grade levels. The basis objectives of the study were:

1. to determine the effects of the Classroom Behavior Management Teaching approach and the Traditional Teaching approach on vocational attitude.

2. to determine the effects of the Classroom Behavior Management Teaching approach and the Traditional Teaching approach on vocational subject matter knowledge.

The subjects of the investigation were fifteen fifth-grade and sixth-grade classes in which a majority of the children were of lower socio-economic backgrounds. Schools included in the study were selected by the administrations of the Hattiesburg and Forrest County, Mississippi, school systems. The selection of classes was based on teacher cooperation and interest. Teachers were assigned randomly to three groups, five to a group. The groups were designated as Experimental 1 (E_1), Experimental 2 (E_2), and Control (C).

Five trained doctoral students from the University of Southern Mississippi were assigned to work for a ten-week period with two teachers, one from Group E_1 and one from Group E_2. Acting as consultants to Group E_1 and as career educators to Group E_2, the doctoral students taught a lesson series entitled "The World of Work" to the two experimental groups. The Classroom Behavior Management approach was used for Group E_1; the Traditional Teaching approach was used for Group E_2. Group C did not receive the lesson series.

At the conclusion of the lesson series, the Crites Vocational Development Inventory and the Career Development Achievement Test were administered to each of the three groups. Group scores from these tests were compared to determine the differential effects of the Classroom Behavior Management approach and the Traditional Teaching approach on vocational attitudes and vocational subject matter knowledge.

From observation of the attitude scores it appeared that those students who received Classroom Behavior Management instruction tended to improve in a significant way over those classes taught in the traditional approach and the Control group. When each of the three groups was compared, there was a significant difference in the mean scores of each group at the .05 level. Investigation indicated the greatest difference to be between Groups E_1 and E_2. The next greatest difference was between Groups E_1 and C, while a comparison of Groups E_2 and C indicated the Control group to have higher scores.

Results of the achievement scores indicated that those students taught using the Classroom Behavior Management approach scored significantly higher than the students in the other groups at the .05 level. A comparison of the means of the three groups indicated tha the greatest difference was between Groups E_1 and C. Groups E_1 and E_2 had the next greatest difference, and Groups E_2 and C had the smallest difference.

Within the confines of the study, the results indicate that the two teaching approaches involving the sample groups had differential effects in both vocational attitude and subject matter knowledge. Based on the empirical results, the Classroom Behavior Management approach appeared to be the most effective method of presentation.

Order No. 72-26,548, 116 pages.

33: 1435-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Greaney (Last name), Vincent (First name), M. (Middle name)

Exact Title A Longitudinal Study of Irish Secondary School Students, Vocational School Students and Dropouts

Degree granted Ph. D., Date 1973, No. of pages in report 368

Granted by Boston College (Name of institution) Boston, Massechusetts (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

A nationally representative sample of eleven-year-old Irish school children (N:500) was followed up four years later in order to determine the post-primary school destination of these students. Thirty separate measures had been obtained on each primary school entrant. These included measures of home background, personal characteristics, educational history and geographical location. A standardized verbal reasoning test was administered to each student in the sample. Information on the remaining twenty-nine variables was obtained by means of questionnaires which were mailed to the students' teachers.

The major purpose of the study was to identify the variables which best discriminated among students who subsequently became secondary school students, vocational school students or primary school terminal leavers. The measures which were obtained while the students were enrolled in primary school were also used to discriminate between stayins and dropouts within each of the following four post-primary groups: 1) Junior cycle secondary stayins and dropouts, 2) Junior cycle vocational stayins and dropouts, 3) Post-junior cycle secondary stayins and dropouts, and 4) Post-junior cycle vocational stayins and dropouts. The end of the junior cycle, the first of two stages of post-primary education, is marked by one of two state examinations. The state examinations are normally taken either two or three years after the student enters post-primary school.

It was determined that slightly over two-thirds of the students had enrolled in a secondary school, one-quarter had enrolled in vocational school, while the remainder had not sought second level education upon leaving primary school. Through the use of stepwise discriminant function analysis two dimensions or functions were identified along which significant differences among the three groups were found. The first and most important dimension was described as an SES-attendance-sex-verbal reasoning-non lay primary school factor. The second function was interpreted as a social maturity-cognitive performance factor. The two functions were used to predict correctly the post-primary school destination of approximately 74% of the students. A subset of fifteen variables was shown to perform the task of discriminating among the three groups almost equally as well as the thirty variables.

Separate multivariate analyses of variance established that in only one of the four post-primary school comparisons was it statistically possible to discriminate between stayins and dropouts. Junior cycle secondary stayins were discriminated from dropouts by means of a function which was interpreted as a satisfactory primary school behavior record-SES factor.

In addition to the multivariate results univariate contrasts of secondary entrants, vocational entrants and primary school terminal leavers, and also of post-primary stayins and dropouts were examined. The results of these contrasts were compared with the findings of a number of related studies.

The study concluded that SES, school attendance record, sex, verbal reasoning ability and primary school behavior records were the major discriminators among secondary school entrants, vocational school entrants and primary school terminal leavers. At most levels, dropping out of school appeared to be related to school attainment and verbal reasoning ability. The findings also suggest that the dropout rate in a particular geographical area may well be related to the employment opportunities in that area. The results seem to indicate that a sizable minority of secondary students are unsuited for the secondary schools. With regards to the vocational schools, the relatively high dropout rate and poor performance record on state examinations coupled with the inability of these schools to attract their proportionate share of the more able primary school students suggests that a full scale review of the present status of vocational education in Ireland is needed.

The implications of the results for Irish education are discussed and a number of suggestions for further research are offered. Order No. 73-11,369, 368 pages.

33: 5967-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Greenwald (Last name), Martin (First name), L. (Middle name)

Exact Title The Effectiveness of Teacher Constructed Three-Dimensional Animated Mock-Ups and Models as Compared to Conventional Methods in Teaching the Technology of Selected Raw-Materials Processing in Industrial Arts in New York City

Degree granted Ed. D., Date 1972, No. of pages in report 184

Granted by New York University (Name of institution) Washington Square, New York (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Summary of the Study

It has been the purpose of this study to ascertain the relative effectiveness of teacher constructed three-dimensional animated models and mock-ups in comparison to conventional techniques of classroom instruction in the presentation of selected raw material conversion processes in industrial arts education.

The experiment of the study was conducted in O. Henry Intermediate School 70, New York City. The study involved a total sample of 216 randomly selected students from the school population in grades six, seven and eight. A pre test-post test control group rotational design was employed in the presentation of information to experimental and control groups. The instructional units were two areas of raw material conversion processes: the manufacture of paper from wood; and blast furnace ironmaking. These two instructional units were chosen for purposes of this study by seventy randomly selected industrial arts teachers in New York City. The teachers filled out questionnaires which requested the respondents to select two areas of raw material processing from a master list of nine such processes. The master list of processes was compiled from industrial arts curriculum guides published by the New York City Board of Education, since 1966, for intermediate and junior high school grade levels. Once the selection of the instructional units had taken place, construction of the mock-ups and models was undertaken. Animated models and mock-ups were designed and fabricated for each of the two instructional units to be taught in this study by the researcher. Flip charts, similarly designed and prepared, served as the traditional technique of classroom instruction. The information content of both the flip charts and teacher constructed animated devices was identical for each of the raw material processing units. A committee of three regularly licensed industrial arts teachers with master's degree in industrial education served as a jury of experts to help ascertain the content validity of all instructional material used during the course of this study.

The effectiveness of the experimental and traditional techniques of classroom instruction was measured by achievement tests which were prepared specifically for each of the two raw material units taught. The achievement tests were validated prior to their use in this study by conducting a pilot study in order to ascertain the internal consistency reliability of the tests and to perform an item analysis on each of the test questions to insure that all test items were discriminating.

Results and Conclusions

The statistical analysis of post test results was accomplished by calculating t-values between each corresponding experimental and control group for each of the two instruction units. Accuracy of statistical tabulations was double-checked by running all raw data through a computer programmed for t-test analysis.

Based on the statistical analysis of post test results, the basic hypothesis of the study which stated that the experimental technique of classroom instruction involving the use of the teacher constructed animated models and mock-ups would prove to be superior to the conventional technique of classroom instruction, was rejected.

Order No. 72-26,633, 184 pages.

33: 1477-A Oct '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Gruen, Clemens, Andrew
(Last name) (First name) (Middle name)

Exact Title The Identification and Organization of Equipment, Materials, Techniques, and Processes of Low-Power Transmission Holography for a Visual Communications Program

Degree granted Ed. D., Date 1973, No. of pages in report 152

Granted by University of Northern Colorado Greeley, Colorado
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

The purpose of this study was to identify and organize the information necessary to place a program of holography in a visual communications program. This study attempted to take this photographic process and analyze it, so as to be able to report in easy-to-understand language the equipment, materials, techniques, and processes of low-power transmission holography.

Procedure

The procedure for collecting the data of low-power transmission holography included computer searches of the ERIC, AIM, ARM, and ACIATE-NAITTE summaries. Dissertation Abstracts; the Art Index; Current Index to Journals in Education; Business Periodical Index; Education Index; New York Times Index; Readers Guide Index; U. S. Government Research and Development Reports Index; Kallard's Holography: State of the Art, 1969, 1970; and the Society of Motion Picture and Television Engineers Journal were scanned for information relating to low-power transmission holography. Selected companies currently producing holograms were visited to see what industry is doing with holography. Visits were made to selected public and private educational institutions to see what they were doing with holography. Finally, limited experiments were run to test the equipment, materials, techniques, and processes of low-power transmission holography.

The data collected were presented in narrative form using tables, charts, diagrams, and photographs. The material was presented in simple non-technical terms that were easy-to-understand by the non-scientist.

The Equipment, Materials, Techniques, and Processes of Low-Power Transmission Holography

Holography is defined as a photographic process that records images on film using coherent light and reconstructs the images in true three-dimension. The information identified and organized into a useful form for the visual communicator included the nature of light, lasers, laser safety, holography, equipment, materials, techniques, processes, reconstruction, and copying holograms. These topics were identified as being the significant topics necessary to understand how to make and reconstruct low-power transmission holograms.

Selected Implications

1. Societies must learn to live with and use new technologies of change such as innovations in communications like holography. 2. Holography can add a new dimension to the field of visual communications. The photographer has a new method of photography. The artist has a new method of expression. The science student has a new way to study the nature of light better. The media student has a new tool of instructional technology. 3. The development of a holographic system requires no prior knowledge of conventional photography and with some basic procedures and equipment almost anyone can make a hologram. 4. Tomorrow, if not already, holography will be a common household word.

Order No. 73-26,500, 152 pages.
34: 2360-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Grywalski, Stanley,
(Last name) (First name) (Middle name)

Exact Title A History of Technical-Vocational Education in the Secondary Schools of Alberta, 1900-1969

Degree granted Ph. D., Date 1973, No. of pages in report 482

Granted by University of Oregon Corvallis, Oregon
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

This study examines the historical development of technical and vocational education within the secondary schools of Alberta from 1900 to 1969 with particular reference to the influence of the Department of Education and of the impact of the TVTA Act (1960). The method of study is chiefly bibliographical, supplemented by interviews. Most of the information has been taken from primary sources, although secondary materials also have been consulted.

The study reveals that technical-vocational education in the secondary schools has been slow in emerging and that various forces and circumstances have not been propitious for its growth. In fact, it is rather surprising that technical-vocational education has survived. Not only have the economics of the province on many occasions hampered its development, but the lack of public concern has had much to do with its very limited success.

Technical-vocational programmes have been associated most closely with the composite high schools, and it was not until the 1950's that the composite high school movement gained strength. Prior to 1945 it remained almost non-existant; consequently, technical-vocational programmes were severely restricted in numbers and confined primarily to some secondary schools in the cities of Calgary, Edmonton, Lethbridge and Medicine Hat. Although technical courses were available in a number of secondary rural schools, they were not vocational in orientation or purpose.

After the promulgation of the TVTA Act in 1960, federal aid to permit the expansion of technical-vocational education brought about an unprecedented construction and expansion of composite and vocational high schools within the province. By 1969 school authorities had spent in excess of $75,000,000 on buildings and equipment. With this expansion came an accompanying differentiation of the curriculum, and numerous educators and personnel from industry and commerce devoted their efforts to the development of appropriate curricular units in the various technologies.

Yet, an analysis of the effects of the TVTA legislation and of previous actions adopted by the Department of Education as regards to technical-vocational education reveals numerous problems and weaknesses. The attempts to articulate the technical-vocational programmes with the technical institutes have not been successful, very few students have utilized the technical-vocational programmes as a stepping stone to apprenticeship, and the number of graduates, particularly of the three year courses, has been small. Operational costs have remained high, perhaps excessively so, and in many cases a poor deployment of technical-vocational staff has been common. The failure of the Department of Education to provide meaningful leadership or to define with clarity the appropriate goals and philosophy of technical-vocational education has resulted in needless conflicts and criticisms.

To these conditions can be added the continued indifference of secondary students to technical-vocational education and the continued failure of the public, business and commerce to recognize the merits of any education other than the academic.

In the face of these and other exigencies, there is a need for the Department of Education to examine the issue of retaining technical-vocational education in the secondary schools and to decide whether technical-vocational education should be exploratory rather than vocational in nature.

This study recognizes that federal shared-cost conditional grants serve useful purposes and that they assist in effecting national ends. In the case of the TVTA Act, financial assistance was provided to Alberta to assist in the alleviation of a national shortage of skilled manpower and to provide industrial education to secondary students. That the Act failed to provide a formula for a more equitable distribution of monies between a wealthy province, for example Alberta, and the less affluent ones was one of the serious faults which warranted federal scrutiny and correction.

The nature of present technological changes and the growing economic disparity among the provinces suggests an increased need for the Federal Government to provide financial assistance and guidance to education. Towards this end, an "educational authority" at Ottawa would prove of immeasurable value. Increasingly, education must escape the constraints of narrow provincialism and become a concern of the entire nation. Whether it will be able to do so is problematic, but failure to do so can only bring about undesirable cultural and economic consequences.

Order No. 73-20,210, 482 pages.

34: 1023-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Guentzler (Last name), William (First name), Douglas (Middle name)

Exact Title A Rationale for and Structure of Fluid Power Technology with Implications for Industrial Arts Teacher Education.

Degree granted Ph. D., Date 1973 No. of pages in report

Granted by Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To: 1) identify the "state of the art" within the field of fluid power technology: 2) develop a rationale for and structure of the body of knowledge of fluid power technology; 3) identify the major elements of fluid power technology; 4) identify the physical science principles utilized in fluid power technology; 5) identify the relationships between principles of physical science and fluid power technology; and 6) assess and revise the subject matter content of the exemplary course of study developed in the study.

Source of data and method of study:

Findings and Conclusions:

The assessment process was completed by a jury of experts representing the fluid power industry and education. Data gathered from the Q-sort instrument were analyzed in order to determine the amount of revision required in the subject matter content. Correlation coefficients were computed and a cluster analysis performed on the data to determine the degree of similarity among jurists' ratings. Based upon an analysis of the data received, the writer's original curriculum development effort was substantially confirmed through the Q-methodology assessment and a revised collegiate course outline is presented.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Gurbach, Thomas, William
(Last name) (First name) (Middle name)

Exact Title Graduate Teaching Assistant Functions in Industrial Education Programs

Degree granted Ed. D., Date 1973, No. of pages in report 155

Granted by Indiana University Terre Haute, Indiana
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The use of graduate teaching assistants to supplement the efforts of regular teaching staff has been a major factor in coping with the unprecedented demand for undergraduate instruction in many colleges and universities throughout the nation during the past quarter-century. Although the teaching assistant system has made a substantial contribution to higher education by assisting with instructional responsibilities, numerous deficiencies which detract from the overall effectiveness of the use of teaching assistants have been identified.

STATEMENT OF THE PROBLEM

The purpose of the study was to investigate the relationship between the functions performed by graduate teaching assistants in college or university industrial education programs and selected situational and personal characteristics.

PROCEDURES

The survey method was used for this nationwide study. The population was comprised of all graduate teaching assistants employed in industrial education departments which grant graduate degrees. Department chairmen from 139 (98.7 percent) institutions provided the names of 319 teaching assistants. A questionnaire was developed to collect data concerning functions performed (role) by teaching assistants and selected personal and situational characteristics. Because the study focused on the utilization of teaching assistants in industrial education programs, the type role occupied by these individuals was the central variable. Four teaching assistant roles were defined ranging from that of assuming complete or major responsibility for one or more courses to that of providing noninstructional assistance to faculty members. The questionnaire was mailed to a census of the population, of which, 92.8 percent responded. Fourteen null hypotheses were formulated and tested to ascertain if significant relationships existed between selected variables associated with the teaching assistantship. The analysis of variance, t-test, and chi square statistics were used to analyze the data. The .05 level of significance was adopted for tests throughout the study.

FINDINGS

1. More than 95 percent of the teaching assistants in industrial education programs met with students in a classroom or laboratory situation and approximately two-thirds were assigned major or complete responsibility for teaching one or more courses.

2. Teaching assistants occupying the position with the highest level instructional responsibilities were employed in institutions having the largest enrollments.

3. Teaching assistants occupying the position with the highest level instructional responsibilities were employed in institutions which offered the doctor's degree.

4. Teaching assistants assigned high level instructional responsibilities were of the opinion that a longer time is required for them to complete a graduate degree than for research assistants.

5. Teaching assistants occupying the position with the highest level instructional responsibilities participated to a greater extent in faculty affairs.

6. Teaching assistants holding undergraduate teaching degrees were more frequently assigned higher level instructional responsibilities.

7. Teaching assistants with longer periods of assistantship service were assigned higher level instructional responsibilities.

8. Teaching assistants pursuing the highest level graduate degrees were most frequently assigned the highest level instructional tasks.

9. Teaching assistants anticipating a career in teaching are more often assigned high level instructional responsibilities.

10. No significant relationship was found to exist between the level of instructional responsibility (role) and the following variables: (1) size of industrial education department, (2) financial value of the assistantship, (3) availability of a formal program of training and supervision, and (4) prior teaching experience.

CONCLUSIONS

Regarding the concerns expressed in the literature toward the use of teaching assistants in general, evidence demonstrated that both desirable and undesirable practices were associated with the use of teaching assistants in industrial education programs. Order No. 73-10,821, 155 pages.

33: 6152-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Guth, Theodore, Edwin Frances
(Last name) (First name) (Middle name)

Exact Title An Appraisal Instrument for Industrial Arts Education in the Public Secondary Schools of North Carolina

Degree granted Ed. D., Date 1973, No. of pages in report 147

Granted by University of Pennsylvania Philadelphia, Pennsylvania
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to design and test an appraisal instrument for industrial arts education in the North Carolina public secondary schools. Although school officials and administrators have advocated the need for assessment of these programs, until now, no significant effort has been made to devise a definitive instrument to appraise industrial arts education programs for state accreditation purposes.

The initial step in the design of the appraisal instrument was to secure basic evaluative elements from published research studies and state and national specialized publications, articles and reports, checklists, and innovative program materials. From these sources, fifteen categories of statements were identified for inclusion in a checklist.

Using a four-point scale, a nine-member jury, composed of industrial arts education specialists at the national, regional, and state levels validated 84 percent of the 210 statements in the checklist. Their recommendations resulted in a revised instrument consisting of 176 tentative criteria in 5 major categories: (1) Organization and Administration, (2) Instructional Program, (3) Physical Plant, (4) Instructional Staff, and (5) Equipment.

The tentative criteria were field-tested by one teacher in each of four North Carolina schools--an urban junior high school and senior high school and a rural junior high school and senior high school. To establish consistency, the test-retest method, allowing a fifteen-week interval between tests, was employed. In late January, 1972, each teacher used a five-point scale to appraise his own program. Then, using the same instrument, in May, 1972, each teacher again appraised his program.

The results of the field-test ratings indicated that criteria acceptability in the four programs ranged from 175 to 176 of a total of 176 tentative criteria. Using an arbitrary test-retest difference limit of two or a mean difference of 1.00 as a basis for acceptability, 98 percent or 171 of the tentative criteria were retained in the appraisal instrument.

Specifically, this study achieved the following: (1) ascertained statements to be used in an industrial arts education checklist; (2) developed tentative criteria from the checklist according to ratings and recommendations of a jury of specialists; (3) designed an appraisal instrument equally suitable for use by teachers, administrators, and state consultants; (4) determined acceptability of the tentative criteria through field-testing in four selected North Carolina schools; and (5) modified the appraisal instrument on the basis of field-test results.

Observations made throughout the study suggested that additional field-testing of the instrument by administrators and state consultants was desirable. The application of the instrument to a larger sample and to out-of-state secondary industrial arts education programs was advocated. Finally, because of the purposeful revaluation and redirection of industrial arts education programs, constant revision of criteria was suggested as imperative. Order No. 73-27,561, 147 pages.

34: 2360-A Nov '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Hales (Last name), James (First name), Andrew (Middle name)

Exact Title Essential Determinants of Technological Literacy for High School Graduates

Degree granted Ed. D., Date 1972, No. of pages in report 179

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this research was to identify the facts, principles, concepts and laws considered as essential determinants of technological literacy appropriate for high school graduates. A second aspect of the research was to classify and validate the elements through the use of a content by level matrix.

The Delphi technique was the method selected for identifying the elements comprising technological literacy. A jury of ten interdisciplinary scholars was established and interrogated through a series of questionnaires. The first questionnaire resulted in a long list of items as submitted by each juror and considered by him to be essential elements of technological literacy.

The compiled results of questionnaire one were resubmitted to each juror as a part of questionnaire two. Each juror was asked to suggest deletions and/or additions to the list. The results were recompiled to a revised list excluding items deleted.

Each item on the revised listing was classified in two ways. First, it was classified according to the broad area of technology it represented – transportation, communication, production, science, social, cultural. Secondly, it was classified under one of the categories of knowledge according to Bloom's taxonomy – terminology, facts, conventions, trends and sequences, classifications and categories, criteria, methodology, principles and generalizations, theories and structure. The items, thus classified, were entered into a matrix.

Questionnaire three asked each juror to again add or delete items, indicate changes in the placement of items within the matrix and suggest changes, if any, within the technology categories of the matrix. The jury responses indicated a change in the placement of one item within the matrix. Consensus was thus achieved thereby eliminating the fourth questionnaire which was intended to serve the purpose of further catalysis.

In order to verify the jury's early consensus and satisfy questions that might be raised concerning the placement of items within the matrix, a reclassification conference was established. Nine consultants were utilized in a one-day reclassification of all the Delphi elements.

The Delphi technique appears to be an acceptable procedure for obtaining this kind of information. The technique is timely, considers the opinion of experts and takes advantage of multiple opinions. However, the educational background and experiences of the jurors and/or consultants may have bearing on their responses to the particular problem.

The items listed and classified in this research represent the elements of technological literacy as perceived by ten experts. It is not necessarily a final list but it is a starting point in the process of determining the composition of technological literacy.

Order No. 73-821, 179 pages.

33: 3342-A Jan '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Halfin (Last name), Harold (First name), Herman (Middle name)

Exact Title Technology: A Process Approach

Degree granted Ed. D., Date 1973, No. of pages in report 321

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Processes are those functional skills--some authors call them intellectual skills--which are the random or ordered methods, strategies, or operations used by a technologist to accumulate knowledge about an artifact or to solve a technological problem. It has been proposed in industrial arts education that it is just as important for the student to learn the processes of a technologist as it is for him to learn the content of technology.

Problem

The problem was to: (a) to identify the processes of a technologist, (b) define operationally the identified processes, and (c) validate the operationally defined processes by submitting them to a jury of experts.

Procedures

The processes of a technologist were identified through a review of the writings of ten high-level technologists. Fourteen processes which technologists utilized to accumulate knowledge about an artifact or solve a technological problem were inferred from this review. In addition, ten interviews were conducted to determine whether the processes were appropriate to technology.

The fourteen processes were defined in both general terms and operational detail. The process definitions were derived from a review of general works related to engineering, psychology, and technology. Interviews of knowledgeable technologists, mathematicians, designers, industrial engineers, engineers, and educators aided in defining the processes. In addition, several classes at a university provided many excellent operations which were incorporated into the operational detail. The fourteen processes were defined operationally by 122 operations.

The Delphi technique was utilized to validate the processes of a technologist. A jury of twenty-eight experts selected from humanists, scientists, and technologists responded to the three interrogations of the Delphic probe.

The first interrogation requested the jurors to add to, delete from, or modify any of the process general definitions and defining operations. Every process definition was revised: many of the operations were revised. The jurors added three processes making the total seventeen and the operations were increased from 122 to 219. The seventeen processes were:

1.0 Defining the Problem or Opportunity Operationally
2.0 Observing
3.0 Analyzing
4.0 Visualizing
5.0 Computing
6.0 Communicating
7.0 Measuring
8.0 Predicting
9.0 Questioning and Hypothesizing
10.0 Interpreting Data
11.0 Constructing Models and Prototypes
12.0 Experimenting
13.0 Testing
14.0 Designing
15.0 Modeling
16.0 Creating
17.0 Managing

Processing 1.0, 16.0, and 17.0 were added as a result of the first interrogation.

The second and third interrogations of the Delphic probe permitted the jurors to specify their agreement or disagreement with an operation that defined a process. For an operation to be accepted, sixty per cent or seventeen jurors had to agree to that operation. As a result of the second and third interrogations, the number of operations was reduced from 219 to 212. If a juror could not agree with an operation, he was asked to state why the disagreement. This provided the basis for a minority report. In addition, the jurors were asked to arrange the processes hierarchically. No consensus was achieved as to the hierarchy.

Conclusions

The results of this study indicated that (a) the seventeen processes and their operational definitions were valid and they appeared to be stable over time; (b) the processes provide the curriculum planners with an added dimension for developing curriculum related to the technologies. It was recommended that curriculum planners who consider technology as a basis from which to develop curriculum begin immediately to incorporate the process approach into programs of industrial arts education.

Order No. 73-23,867, 321 pages.
34: 1586-A Oct '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Hansen (Last name), Gary (First name), Glenn (Middle name)

Exact Title The Effect of Temporal Placement of Information Feedback on the Retention of Meaningful Cognitive Material in Industrial Education

Degree granted Ph. D., Date 1972, No. of pages in report 103

Granted by Purdue University (Name of institution) Lafayette, Indiana (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to identify the facilitating effects, if any, that the temporal placement of information feedback had on the retention of meaningful cognitive material. Junior high school students read a special instructional unit on the metric system of measurement, and then were tested over acquisition of the material. Each experimental treatment group received different periods of delay between completion of the acquisition test and the provision of information feedback. One week after the subject received information feedback, a test of retention was administered. Four modes of temporal positions of information feedback were used in this study. They were, in order of delay:

1. IFI: Information feedback after each item of the acquisition test.
2. IFT: Information feedback after completion of the acquisition test.
3. 1DD: Information feedback 1 day after the acquisition event.
4. 2DD: Information feedback 2 days after the acquisition event.

The subjects for the experiment were 162 seventh and eighth grade students currently taking industrial arts courses in selected junior high schools. Intact classes of students were randomly assigned to one of the four experimental treatments. In addition, one intact class was randomly designated as a control group, and 16 students from a non-participating school were used as a comparison group.

A 15-page booklet on the topic of the metric system of measurement was constructed to conform to a set of educational objectives developed for that purpose. In conjunction with the booklet, a thirty-one item, four alternative multiple-choice criterion test instrument was developed and validated. All subjects read the booklet for a maximum of 25 minutes. At the end of this period, the booklets were closed and the criterion test was administered to all subjects in order to obtain a measure of acquisition.

After the acquisition event, the designated delay period was observed before subjects in each treatment group received information feedback by independently correcting their acquisition test using [illegible] Trainer-Tester Response Card. One week after the provision of information feedback to each experimental group, the criterion test was repeated in order to obtain a measure of retention.

A series of research hypotheses was tested at the .05 level of statistical significance. The findings of these tests were: 1. All experimental subject groups learned more from their experience with the metric material than could be attributed to chance. 2. There were no significant differences among the groups receiving the four experimental treatments when mean scores on the acquisition test served as the criterion. 3. There was no significant interaction between the levels of acquisition and the levels of retention. 4. The group receiving the IFT experimental treatment scored significantly lower on the retention measure than did the groups who received the other three experimental treatments. 5. The experimental treatments of IFI, 1DD and 2DD did not differ significantly from each other in terms of promoting retention.

The findings of this study do not offer support for a delay-retention effect. Also, the principle of the superiority of immediate information feedback was not supported, when the criterion is retention. Order No. 73-6037, 103 pages.

(33: 4906-A) March '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Hartell, William, Raymond
(Last name) (First name) (Middle name)

Exact Title Effects of Knowledge of results on Acquisition of Motor Skill in Arc Welding

Degree granted Ph. D., Date 1972, No. of pages in report 106

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose: The purpose of the study was to investigate the effects of four selected methods of providing knowledge of results, information feedback, on acquisition of motor skill in arc welding. A further purpose was to ascertain the effect of different instructors on criterion performance on selected arc welding tasks.

Method of Research: Eighty male college students enrolled in two sections of an introductory agricultural mechanization course, taught by different instructors, were selected as subjects for this study. Each section was sub-divided into two laboratory sections and the subjects within each laboratory section were randomly assigned to four experimental groups. The subjects received knowledge of results on arc welding task performance through: (1) visual evaluation and constructive criticism by the instructor, (2) self evaluation by comparing performance to prepared models, (3) group evaluation by subjects within each experimental group, or (4) subject and instructor evaluation of coupons derived through the implementation of the Nick-break test.

A 2 x 4 pretest-posttest design was utilized. Subjects were pretested at the beginning of the supervised laboratory training period which consisted of nine, two-hour sessions. The experimental treatment was administered during this period and subjects were posttested upon its completion.

Data for the experiment were derived by the implementation of the Nick-break test on all pretest and posttest weld specimens. A coupon taken from each specimen was scored by the investigator.

Two-way analysis of covariance was used to test for significant treatment, instructor and interaction differences. Correlation coefficients were used to test for correlation between pretest and posttest scores.

Findings: Performance on the four complex arc welding tasks was not significantly affected by the four selected methods of providing knowledge of results on performance during supervised practice. Correlation between pretest and posttest scores for the flat position butt weld was not significant. However, a significant correlation was found between pretest and posttest scores for the three out of position arc welding tasks. Criterion performance was significantly different for the groups taught by different instructors on three of the four arc welding tasks.

Conclusions

1. If KR is provided students of agriculture enrolled in introductory arc welding courses with 18 clock hours of supervised laboratory training by one of the four methods utilized in this experiment, then criterion task performance scores will not be significantly different, as measured by the Nick-break test.

2. If introductory arc welding courses are taught by different instructors, then criterion task performance scores may be significantly different as measured by the Nick-break test.

3. If an 18 hour supervised laboratory training period is provided, then the correlation between pretest and posttest scores will be significant for the out of position arc welding tasks as measured by the Nick-break test.

4. If an 18 hour supervised laboratory training period is provided, then the correlation between pretest and posttest scores will not be significant for the flat position arc welding task as measured by the Nick-break test.

Order No. 73-21,431, 106 pages.

34: 1184-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Harris (Last name), Marshall (First name), Allen (Middle name)

Exact Title A Benefit -- Cost Analysis of Selected Vocational Education Programs In Florida

Degree granted Ph. D., Date 1972, No. of pages in report 131

Granted by The Florida State University (Name of institution) Tallahassee, Florida (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purposes of this study were fourfold: (1) it developed a methodology for conducting a statewide benefit-cost analysis of vocational education programs in Florida; (2) it examined, compared, and analyzed the public and private (individual) benefit and cost aspects of four vocational education programs in Florida; (3) it compared and analyzed the public and private benefit and cost aspects of students who attended vocational education programs while enrolled in day high school (secondary students) and students not enrolled in day high school (nonsecondary students); and (4) it generated formulae which resulted in the development of a model for predicting investment returns of vocational education programs.

Incorporating existing program cost data with data collected by means of student follow-up questionnaires, this study consisted of four principal phases.

In the first phase four vocational education programs--auto mechanics, air conditioning and refrigeration, practical nursing, and cosmetology--located at area vocational centers in four designated geographical regions of Florida were selected.

In the second phase methodologies for determining program benefits, costs, and benefit-cost ratios were developed. Criteria and algorithms for measuring benefits relative to labor market performance were developed. Costs were determined by algorithms based upon a student's length of time in attendance in the program. Benefits were then linked to costs in the form of discounted benefit-cost ratios. The discounted benefit-cost ratio was a number which indicated the percentage rate of return on investment in vocational education programs.

In the third phase historical benefit-cost profiles for each of the four vocational programs, and for secondary and nonsecondary students in all programs were constructed. The benefit-cost profiles were then analyzed and compared between vocational education programs, and between secondary and nonsecondary students.

In the fourth phase the procedures and data used in constructing the historical benefit-cost profiles were incorporated into a benefit-cost planning model which enables projection of benefit-cost ratios into the future.

The more cogent findings of this study were as follows: 1. On both public and private investments, the air conditioning and refrigeration program had statistically significant higher rates of return than did either the auto mechanics, practical nursing or cosmetology programs. Among the latter three programs, however, there were no significant differences in rates of return on investment. 2. There were statistically significant differences in rates of return on investment between secondary and nonsecondary students. On both public and private investments, nonsecondary students had higher rates of return than did secondary students. 3. On the average, student costs of vocational education were greater than public costs. Student costs represented about 60 per cent of the total cost of education.

The benefit-cost profiles which were constructed indicated that public and private rates of return from investment in each of the four vocational education programs were positive and significant. Therefore, it was concluded that investment in these programs was economically profitable both to society (public) and to the individual (private).

Order No. 73-224, 131 pages.

33: 3194-A Jan '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Harvey, David, Watson Hawkins
(Last name) (First name) (Middle name)

Exact Title The Validity of Holland's Vocational Preference Inventory for Adult Women

Degree granted Ph. D., Date 1971, No. of pages in report 126

Granted by University of Connecticut Storrs, Connecticut
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

An increased demand for testing and vocational guidance services has paralleled the increased participation of adult women in the labor force. In addition, with the shift in women's vocational status away from the dichotomy of career or marriage as a life style, counselors have been challenged to provide meaningful guidance for adult women. While in demand, guidance procedures for adult women have been used in spite of a lack of theory-based research evidence supporting their validity. Research data support the validity of Holland's theory of personality and vocational selection for male and female high school and college age populations. However, validity data was needed for an adult population for the constructs in Holland's theory if the theory, and its chief measurement instrument the Vocational Preference Inventory (VPI), were to be used in the guidance and counseling of adult women. Indeed, the theory may need revision with respect to the vocational development of women and with respect to whether the models of personal styles in the theory hold validity for older people at all.

This study was designed to examine the validity and test-retest reliability of Holland's VPI for adult women. The central research hypothesis was that Holland's personality Types, as identified by the VPI, were valid descriptors of women's personality styles and vocational interests. The study was conducted in three phases: (1) Certain correlational relationships were predicted between the VPI occupational scales and selected scales on the Strong Vocational Interest Blank for Women, the Edwards Personal Preference Schedule, the Study of Values and the Differential Aptitude Tests. The predictions were made on an a priori basis, which may be called a deductive process of reasoning, by studying the definitions of Holland's Types and relating these to the definitions of selected scales on the criterion measures. The results of relating the definitions of the Types (Realistic, Intellectual, Social, Conventional, Enterprising and Artistic) to the criterion scales produced predictions of expected directions of correlations between the Types and the criterion scales. (2) The VPI was administered at the beginning of a group guidance and testing program for women so that preference for Holland's six styles might be correlated with the selected scales on the criterion tests. Correlations were also computed between the VPI and other scales on the criterion measures but no predictions were made as to the direction of these correlations. (3) After computation of the validity coefficients between the VPI and the criterion measures the determination of statistically significant relationships between the VPI scales and the criterion measures was accomplished.

Reliability of the VPI was examined by computing reliability coefficients between the test and retest scores gathered from two administrations of the VPI which were separated by a two to three week interval.

The results of this examination revealed statistically significant correlational evidence which supported the validity of Holland's VPI for use with adult women. However, the Social scale and the Artistic scales of the VPI remained in doubt as to their validity for this sample of women. Reliability of the VPI was shown to be acceptable. Although certain scales of the VPI were skewed, there appeared to be sufficient validity with this female adult sample to suggest that it can be used, with caution, as an economical vocational guidance measurement instrument within the context of Holland's theory. An additional finding indicated that this sample of women seemed to gravitate to the Conventional occupations, and, at their present life stage these women tended to reject the nurturant role.

Order No. 72-14,234, 126 pages.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Heinsohn (Last name), Marvin (First name), Edward (Middle name)

Exact Title Equalization of Local Tax Rates Required to Finance Vocational Education

Degree granted Ed. D., Date 1973, No. of pages in report 119

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study dealt with the distribution of Federal (P.L. 876, Part B) vocational education funds from states to local school districts. There were four objectives to the study:

1. To identify the differences in local district tax rates required to pay for the residual costs of their vocational education programs.
2. To seek to discover a relationship between the local residual cost tax rates and the extent of the vocational education programs in the districts.
3. To design a model allocation system that would distribute the Federal vocational education funds from the states to local districts in such a manner that the range between districts' vocational education residual cost tax rates would be reduced.
4. To test the model allocation system on a randomly selected number of districts in California to determine if it would reduce the range in the districts' vocational education residual cost tax rates.

Crucial to this study was the conceptualization of residual cost, which was defined as that portion of the total cost of vocational education per student left unpaid by the states' foundation program amounts per student.

Twenty-one districts in seven states were surveyed to gather data for the first two objectives of the study. A model allocation formula was designed and tested on a randomly selected sample of California high school districts to accomplish the last two objectives.

Vocational education residual cost tax rates were found in all districts studied. The rates differed within and between states. Higher residual cost tax rates were found: 1. with smaller enrollments; 2. in low-wealth districts; and 3. in high-wealth districts that offered the most expensive occupational courses to their students.

The following relationships were discovered between vocational education residual cost tax rates and programs:

1. The largest percent of student contact hours in high residual cost tax rate, low-wealth districts were in low-cost occupational courses.
2. Most low-wealth school districts did not offer a full vocational education program, including the most expensive occupational courses.
3. The most expensive occupational courses were found mainly in high residual cost tax rate, high-wealth districts.

Equalizing-percentage formulas were proposed for use by states in the distribution of their Federal vocational education funds because:

1. They are easily administered, flexible mathematical expressions of the qualization process.
2. They represent an acceptable compromise to the Serrano-Priest type court decisions. They would allow the continuance of local property taxes, with the resulting emphasis on local control.
3. In the test conducted in this study, they increased the degree of equalization in distributing a limited amount of funds by reducing the range of vocational education residual cost tax rates in a randomly selected sample of districts.

Order No. 73-18,630, 119 pages.

34: 529-A Aug '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Herschbach, Dennis, Robert
(Last name) (First name) (Middle name)

Exact Title Industrial Education Ideology, 1876-1917; A Social and Historical Analysis

Degree granted Ph. D., Date 1973, No. of pages in report 480

Granted by University of Illinois at Urbana Champaign, Illinois
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The years between 1876 and the passage of the Smith-Hughes Act of 1917 can be characterized as the formative period in the industrial education movement in the United States. It was in these years that industrial education supporters grappled with the problem of defining the nature of the subject field, and they fashioned an ideology--a concept of industrial education--which served to thrust the subject field into the mainstream of American Social and educational thinking. This study is an examination of the ideology of industrial educators as it is expressed in the statements of schoolmen, the literature of educational associations, and of private, organizational and government publications. The material is substantial and constitutes those ideas, arguments and values publicly expressed with the purpose of influencing the attitudes and actions of others. The problem is to answer the following questions: of what does the ideology of industrial education consist? What is the historical context within which industrial educational ideology has evolved, and furthermore, how has this ideology shifted to accommodate changed educational and social values?

The major focus of the study is upon developing an understanding of the seminal ideas that have given general form and expression to the subject field. In addition, the social context in which these ideas acquired meaning and importance is examined. The ideas of industrial education were a direct outcome of the outlook of numerous social groups. Small businessmen, industrialists, labor leaders, philanthropists, social reformers as well as educators, not only viewed industrial education in light of their own parochial interests, but constantly reinterpreted its function as the composition and ideas of these groups altered and social problems became more or less important over a period of time. Then too, educational development was in a state of flux. Each level of public education--elementary, secondary and collegiate--was itself entangled in a complex and altering pedagogical framework. Educators encountered substantially different problems at the various levels of schooling, and the solutions they offered were as much a product of their own philosophy as of the unique educational challenges they faced. Not surprisingly, industrial education reflected the multiple goals and varied pedagogy of American education, and the ideology developed to support the inclusion and spread of the subject can best be understood by examining it in the context of the broader educational movement on the three levels of education. In sum, what became known as industrial education grew out of an educational synthesis--the blending of a number of social and educational ideas. This study is an attempt to isolate and identify major ideological positions, explore the relationship of these positions to perceived social and educational problems, and gauge the consanguinity of these ideas to social and educational thinking in general.

Order No. 73-17,557, 480 pages.
34: 159-A July '73

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Hicks (Last name), Carol (First name), Eugene (Middle name)

Exact Title Noise Pollution as a Potential Safety and Health Hazard Within Selected Utah Industrial Education Laboratory Facilities.

Degree granted Ed. D., Date 1973 No. of pages in report 155

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To investigate the existing noise levels within industrial education woodworking and metalworking laboratories to determine whether these noise levels were a problem as seen by the instructors utilizing the laboratories and if these noise livels exceeded the standards set by the Occupational Safety and Health Act.

Source of data and method of study: Opinion responses from every woods and metals instructor throughout Utah were used along with actual environmental noise levels within 30 randomly selected labs. The use of both a sound level dosimeter and a hand held sound level meter were employed. A statistical analysis was used on the statements presented in the questionnaire and to compare the opinions of the instructors to the actual measured noise conditions.

Findings and Conclusions:

The major conclusions reached as a result of the analysis of data include:

1. A potentail safety and health hazard exists with noise pollution within the industrial education facilities.
2. Many members of the profession are not fully informed about the new legislative safety and health standards, OSHA.
3. Most labs are in compliance to OSHA noise standards, however, many do exceed the maximum allowable limits.
4. Under stringent OSHA compliance, certain curriculum alterations would have to be initiated.
5. There is no apparent connection between those labs which were in violation to OSHA noise standards and the composition of size and construction materials.
6. The opinions of the teachers from the field do not necessarily reflect the actual measured conditions of the environmental noise exposures.
7. The din of noise produced around machinery must not be considered a problem relevant only to industry. The usage of machinery in educational settings places the same potential for occupational hearing impairment into the educational laboratory.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author	Hildebrandt,	Robert,	Roland
	(Last name)	(First name)	(Middle name)

Exact Title An Evaluation of a Simulated Building Carpentry Program for Incarcerated Students

Degree granted Ed. D., Date 1973, No. of pages in report 100

Granted by	TExas A&M University	College Station, Texas
	(Name of institution)	(City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

This research involved an evaluation of the "Building Carpentry Simulation Game" at a juvenile detention youth camp. The purpose of the study was to determine if this program, using simulated roles, was as effective in providing instructional gain for incarcerated youth as compared to a traditional Building Carpentry Program. The traditional program, held in reference, was in one of the junior high schools in the community. Three evaluative instruments were used to measure the effective gain in each program. The Qualifying Test for Apprenticeship and Trainee Applicants, published by United Brotherhood of Carpenters and Joiners, was used to measure the knowledge of carpentry fundamentals. The Kuder Preference Record was used to find out what change of interest, if any, took place. A "Reactionaire" was developed to quantify the students' gain in their understanding of labor and business activity, legal and financial considerations, and general construction practice. The experimental design incorporated identical pretest and post-test batteries of the three evaluative instruments. These batteries were given to twenty-five students of the experimental group, the youth camp, and to thirty students of the control group, the junior high school, at about the same time. There were nine weeks between the pretest and post-test. Standardized aptitude test scores indicated that the experimental group was below the National norms by 1.9 grade levels in language arts subjects and 3.4 grade levels in computational subjects. The stanine average of all subjects for the control group was 4.3, thus indicating that they were very close to the National norm. The experimental group had additional disadvantages, as it was composed of only incarcerated juvenile offenders.

The results of the evaluations (considered at the 0.5 level) showed that there were no significant differences between the experimental and control group on the score gain in the "Apprenticeship Qualifying" test. Neither was there a significant change of interest in either group, as shown by the "Kuder" scores. There was, however, a significant difference in the scores' gain in the "Reactionaire," with the greatest gain being recorded by the experimental group. The evaluations were based on a gain-loss factor to compensate for the experimental groups' disadvantage.

It was concluded that the "Building Carpentry Simulation Game" did provide additional instructional content, more knowledge concerning labor, business, legal and financial considerations, while there was no sacrifice in the traditional content or knowledge about the mechanics of building.

The events of the study indicated that the "Building Carpentry Simulation Game" did help to motivate most of the students by involving them in working together and even sometimes opposing each other. Members of the youth camp and the associated school staff felt that the experience in human interaction was a positive attribute for the experimental group." The efforts to manipulate other students and, in turn, their resistance to being manipulated was an eye-opening experience, even though it is typical of society. The social awareness of the students who were actively involved with their roles in the game was observed to increase.

Recommendations based on the conclusions and impressions included: 1. Simulated methodology, such as the "Building Carpentry Simulation Game," should continue to be used in the youth camp Building Carpentry program. It is further recommended that other occupational instruction simulate on-the-job and societal conditions and incorporate gaming techniques into their course offerings. 2. A similar study should be undertaken using larger populations and more contrasting situations of both regular and disadvantaged students.

Order No. 73-21,718, 100 pages.

34: 1111-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Hildreth, Eddie, Jr.,
(Last name) (First name) (Middle name)

Exact Title A Survey for Identifying Automobile Preventive Maintenance Instructional Material for Teacher Preparation and High School Driver Education Curriculums

Degree granted Ph. D., Date 1972, No. of pages in report 211

Granted by Michigan State University East Lansing, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

The automobile has become an integral part of our transportation system. At the same time it has been found that an improperly maintained vehicle is a contributing factor to accidents in the system. This being the case, care of the automobile becomes an increasingly important activity among our population. However, the problem of what the schools should offer to prepare people to care for automobiles, and how it should be offered is still largely unsolved. This is the problem with which this study deals.

It was the purpose of this study to determine what instruction, in the opinion of teacher preparation instructors and representatives from the automobile industry, should driver education teacher preparation institutions and high school driver education courses offer dealing with automobile preventive maintenance.

In order to answer this question a questionnaire was developed to survey the colleges and automobile manufacturers' representatives, asking them to identify those items which they considered important enough to be included in course content dealing with automobile preventive maintenance from the following areas: the importance of teaching (1) How to inspect certain items to determine if they are in need of repair, adjustment, or servicing; (2) how to perform the actual maintenance task; (3) how to detect and identify a potential malfunction; and (4) certain general information and procedures concerning the automobile. The fifth section included general questions concerning the opinions of the respondents toward preventive maintenance and curriculum offerings.

Description of the Methods, Techniques, and Data Used

The population for this survey was limited to the 82 teacher preparation institutions offering a minor and/or major in driver education and traffic safety, as listed in a publication of the National Safety Council entitled *College and University Safety Courses*. In addition, personal interviews with one representative from each of the following automobile companies were conducted: General Motors, Chrysler Corporation and Ford Motor Company.

Prior to mailing the questionnaire, a letter explaining the survey was drafted and a letter of endorsement was obtained from Dr. Robert E. Gustafson, Associate Professor of Criminal Justice and Driver Education of the Highway Traffic Safety Center at Michigan State University.

After three and one-half weeks a follow-up letter was sent to those institutions which failed to respond to the initial mailing. The initial mailing and subsequent follow-up letter produced a 90 per cent response of completed questionnaires. A total of 70 completed questionnaires were received from the 82 colleges and universities sampled.

Responses to the questionnaire were coded for computer use and the tabulated findings were listed and presented with a narrative description by percentages. The responses were divided into five sections in accordance with the areas of interest listed above.

The Major Findings

The survey indicated that the majority of the respondents were of the opinion that:

1. Instruction dealing with general information relating to the automobile and maintenance should be included in teacher preparation, high school and adult driver education curriculums.
2. Teaching preventive maintenance and symptoms of mechanical malfunction of the automobile were more important than teaching detailed instruction of the operating principles and construction of the automobile.
3. Instruction related to the information in the car owner's manual should be stressed in all driver education courses.
4. Of all the items listed for automobile preventive maintenance course content, those items receiving the most favorable responses were (a) how to determine when an automobile needs service and (b) items related to general information and procedures. In contrast, the items receiving the least favorable responses by all the respondents were items related to performing the actual maintenance task.
5. The majority of the respondents indicated that instruction dealing with the parts of the automobile that, if not properly maintained, would contribute to an accident should receive high priority in any phase of instruction dealing with the automobile.

The respondents from colleges, universities and the automobile industry were in close agreement regarding those items of instruction which teacher preparation institutions and high schools should offer dealing with automobile preventive maintenance. The respondents indicated that teacher preparation institutions should offer more detailed instruction than the high schools.

Order No. 72-29,980, 211 pages.

33: 2072-A Nov. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Hill, Joshua,
(Last name) (First name) (Middle name)

Exact Title Construction and Validation of a Scale to Measure the Verbalized Attitudes of Industrial Arts Teacher Educators Toward a Man-Technology Model

Degree granted Ed. D., Date 1972, No. of pages in report 165

Granted by West Virginia University Morgantown, West Virginia
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to construct and validate a scale to measure the verbalized attitudes of industrial arts teacher educators toward a Man-Technology model for the education of industrial arts teachers. To fulfill this purpose, the writer proceeded in the following manner.

First, the literature dealing with industrial arts teacher education in general and with the Man-Technology approach to curriculum design in industrial arts education in particular was examined for item development. The literature concerned with the nature and definition of an attitude and methods of attitude scale construction was reviewed.

Second, a list of items focusing on a Man-Technology curriculum proposal for the education of industrial arts teachers was developed by the writer and reviewed by the faculty and staff of West Virginia University Industrial Arts Education Department for content representativeness and syntax of the statements. Those items judged representative of the content area and suitable in syntax comprised the item pool. This pool of items was then developed into an 88-item Likert-type scale, in which each statement was followed by a 5-step psychological continuum extending from very favorable to very unfavorable toward the statement about the Man-Technology model. The directions requested respondents to indicate their position on the point of view expressed in the statement by checking the response category ("Strongly Agree," "Agree," "Uncertain," "Disagree," "Strongly Disagree") which most accurately reflected their position.

Third, the 88-item questionnaire was mailed to a random sample of 200 industrial arts teacher educators selected from a population list generated from the two directory lists: Industrial Teacher Education Directory: Institutions and Personnel, 1970-71 and American Council on Industrial Arts Teacher Education Membership List, 1970-71. Data for selecting items to form the final attitude scale were secured from the useable returns of this sample. As a result of the analyses of these data, which consisted of an investigation of inter-item correlations, item-total correlations, reliability based on internal consistency, and item characteristic curves, 40 items were selected to form the final attitude scale.

Fourth, the resultant 40-item questionnaire was mailed to (a) 50 industrial arts teacher educators who comprised a sample of two disparate groups for test validation and (b) a random sample of 200 industrial arts teacher educators for test reliability. These two samples had been selected from the population list mentioned above.

All inter-item correlations for the 40 items selected for the final attitude scale were positive and greater than .10. The item-total correlations ranged from a low of .52 to a high of .82, with an average of .65. An internal consistency reliability Coefficient Alpha of .96 was computed. A $t_{42} = 6.002$ was computed between the two disparate groups' mean scores on the scale. Finally, the reliability (stability) coefficient of the scale was found to be .88.

Within the limits of the study, the following conclusions were drawn: 1. The constructed and validated scale did measure the attitudes of industrial arts teacher educators toward a Man-Technology curriculum proposal for the education of industrial arts teachers by quantifying their response to selected statements. 2. The 40-item attitude scale succeeded in tapping a general attitude toward the Man-Technology model. 3. The 40-item scale was found to differentiate between two disparate groups of industrial arts teacher educators who were identified as possessing favorable and unfavorable attitudes toward a Man-Technology rationale and structure. This is evidence of construct validity. 4. The attitude of industrial arts teacher educators toward the Man-Technology model was found to be relatively stable.

Order No. 73-822, 165 pages.

33: 3343-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Holm, Melvin, Gordon
(Last name) (First name) (Middle name)

Exact Title Effect of Stress Producing Situations on Manipulative Performance of High and Low Test Anxious Industrial Arts Students

Degree granted Ed. D., Date 1972, No. of pages in report 107

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose: The purpose of this study was to ascertain the effect which stress producing situations have upon the performance of a manipulative task by high and low test-anxious subjects.

Method of Research: The investigation was conducted as a two-group, controlled experiment. A 2 x 2 factorial design was used with two levels of test anxiety (high and low), and two treatments (stress and non-stress). The task consisted of driving nails into blocks of wood. The two groups were tested for equivalency by means of a t-test. Results of the t-test indicated that the groups were equal, therefore, data from the experiment were subjected to a two-way analysis of variance to ascertain any main effects attributable to the independent variables: test anxiety levels, and treatments.

Findings: The two-way analysis of variance failed to reveal a significant difference in nail driving ability between the high and the low test-anxious subjects when both treatments were compared simultaneously, nor was there a significant difference found between the stress and non-stress treatments when anxiety levels were compared simultaneously. It also failed to reveal a significant interaction between treatments and test anxiety levels.

The analysis of the hammering errors failed to reveal a significant difference in errors between the high and the low test-anxious subjects when both treatments were compared simultaneously, nor was there a significant difference in errors between the stress and non-stress treatments when the test-anxiety levels were compared simultaneously. The analysis also failed to reveal a significant interaction between treatments and test anxiety levels.

Conclusions: Inasmuch as the findings of this experiment failed to show a significant difference in the effect of stress producing situations from that of non-stress producing situations in the quantitative output of either high or low test-anxious subjects in the performance of a manipulative task, it is concluded that under the conditions of this experiment, stress does not significantly effect the quantitative performance of a manipulative task.

Inasmuch as the findings failed to reveal a significant difference in the effect of stress producing situations from that of non-stress producing situations in the qualitative performance of a manipulative task by either high or low test-anxious subjects, it is concluded that under the conditions of this experiment, stress does not significantly effect the quality of manipulative performance.

Inasmuch as the findings of this experiment failed to show a difference in the manipulative performance of high and low test-anxious subjects under stress producing situations, it is concluded that under the conditions of this experiment, stress does not significantly effect the manipulative performance of high and low test-anxious subjects.

Order No. 73-7038, 107 pages.

(33: 4906-A) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Holman (Last name), Marshall (First name), Graves (Middle name)

Exact Title Evaluation of a Teacher Education Program in Electromechanical Technology

Degree granted Ed. D., Date 1972, No. of pages in report 125

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

SCOPE AND METHOD OF STUDY: This study is an attempt to evaluate a Teacher Education Master's degree program in Electromechanical Technology. The program was federally funded and operated through the School of Occupational and Adult Education in conjunction with the Department of Technical Education at Oklahoma State University. There were fifteen graduate fellows initially involved in the program, with thirteen graduating at the end of the fourteen month period. During their fellowship period, these fellows were allowed to participate in a developmental program for training Electromechanical Technicians. Through formal course work and classroom contact with the two-year technician trainees, the fellows were able to gain a thorough insight into the concepts of this third generation technology.

One objective of this study was to show if a more positive or negative attitude toward Electromechanical Technology was developed during the fellowship period. Another objective was to demonstrate that the Electromechanical fellowship program could develop Electromechanical Technology competencies. The third objective was to show the subsequent career activities of the participants upon completion of the program.

Two research instruments were used to evaluate five of the seven research questions. A semantic differential was administered in a pre-, mid-, and post-test situation, and a follow-up questionnaire was sent out eight months after graduation of the fellows.

FINDINGS AND CONCLUSIONS: There was a significant positive attitudinal change in the population toward Electromechanical Technology from the beginning to the end of the program. Those participants with an electronics background generally related more positively to the electromechanical approach to electronics, mechanics, physics, and electromechanics than did those with physical sciences or related technologies backgrounds over the duration of the program. The electromechanical approach to mechanics and physics was weak during the first half of the program but became much stronger and more relative in the latter part.

The participants developed competencies in Electromechanical Technology as evidenced by their ability to develop laboratory instructional materials, conduct an occupational analysis, and instruct in a two-year Electromechanical Technology technician training program.

Five of the thirteen graduates returned to their original institution. Two of these began teaching or directing a program in Electromechanical Technology. Two other graduates obtained employment relating to Electromechanical Technology while six of the graduates did not seek, or were unable to find, a teaching position relating to this discipline. Two of the graduates accepted teaching positions in secondary programs of which one was committed to Electromechanical Technology.

Order No. 73-15,140, 125 pages.
33: 6804-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Honeycutt, Billy, Jack
(Last name) (First name) (Middle name)

Exact Title An Analysis and Prognosis of the Technical Report Writing Curriculum in Texas Public Junior Colleges

Degree granted Ed. D., Date 1973, No. of pages in report 173

Granted by University of Houston Houston, Texas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

With the growing demand in business and industry for employees with technical writing skills and knowledge, this study was planned principally: (1) to determine whether the present technical report writing curriculum was fulfilling the employment qualifications desirable of potential employees, and (2) to determine whether there was a difference in the perceived curriculum content of technical writing by Texas public junior college instructors and training supervisors in business and industry. The secondary objective was to determine whether there was a difference in the Texas public junior college instructor's qualifications to teach technical writing and the qualifications perceived as needed by the training supervisors in business and industry.

Procedure

Questionnaire surveys were made of two groups of subjects in Texas: (1) instructors of technical writing employed in Texas public junior colleges, and (2) training supervisors in business and industry. In the first group were 46 instructors of technical writing in Texas public junior colleges. The second group consisted of 123 training supervisors in business and industry. The business training supervisors were all members of American Society for Training and Development, Houston Chapter, and the industry training supervisors were all members of American Petroleum Institute, District 3 (Gulf Coast), only those members residing in Texas received questionnaires. Two questionnaires were constructed, pretested, revised, and mailed to the subjects. After allowing 35 days to reply, returned questionnaires were edited and processed. Percentage distributions were based on the total number of usable questionnaires received from each group. Data received from questionnaires were processed, analyzed, and interpreted for 91 subjects.

Findings

A principal finding was that instructors of technical writing in Texas public junior colleges agreed with only 50.00 percent of the curriculum content items perceived as Essential or Important by the training supervisors in business and industry. Also, in the Moderately Important curriculum content category the instructors agreed with only 33.33 percent of the content items selected by training supervisors in business and industry. The study also disclosed that training supervisors in business and industry perceived three or four technical writing courses necessary for an individual to be adequately prepared as a technical writer. Yet, 90.48 percent of the instructors of technical writing in Texas public junior colleges suggested one or two courses in technical writing as sufficient. The data also suggested that the junior college instructor of technical writing did not possess all the professional, academic, and experience qualifications necessary to teach technical writing, as perceived by training supervisors in business and industry.

Conclusions:

While other subordinate conclusions were drawn, the major generalization was as follows: the technical report writing curriculum, and those who teach technical writing, need to be redirected in the future if the employment needs of the students are to be realized. Order No. 73-22,914, 173 pages.

34: 1587-A Oct '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Horvath, Ronald, J.
(Last name) (First name) (Middle name)

Exact Title A Comparison of Vocational Technical and College Preparatory High School Graduates at Two Community Colleges

Degree granted Ed. D., Date 1973, No. of pages in report 180

Granted by Lehigh University (Name of institution) Bethlehem, Pennsylvania (City, State)

Where Available: Microfilm (X) Microrish ( ) E.R.I.C. ( )

Community colleges across the nation currently enroll more than two million students, many of whom would not have been admitted to institutions of higher education without a nonselective, open-door policy. As a matter of fact, several research studies have shown that approximately one-third of the students who enter a community college have not taken a secondary school course of study which would permit them to enter a four-year college or university.

Included among those who have not completed a high school college preparatory program is a group generally referred to as vocational technical students. Although the number of research studies directed at community college students has increased during the past five years, very few research efforts have been directed at graduates of vocational technical programs. Thus, there exists a dearth of information and normative data on this segment of the community college student population.

This research study focused on three general areas. First, this study compared 229 male VT graduates and 200 male CP graduates with regard to college graduation and group membership and six intellective variables (ACT English, mathematics, social studies, and natural science test scores; Intelligence Quotient; and high school rank). Second, an attempt was made to assess the curricular enrollment patterns of the 229 VT graduates as they pursued community college programs in one of three general areas: (1) a college career program related to their secondary school curriculum; (2) a college career program unrelated to their secondary school curriculum; or (3) a college transfer program. Third, the study examined the three VT classifications with regard to the same six variables and attempted to develop a model called the Joint Probability Index, a combination of predicted group membership and predicted success conditioned by membership (a first semester GPA of 2.00 or better).

The subjects were selected from two comprehensive community colleges in Eastern Pennsylvania with a combined enrollment of more than 4,000 students. The ex-post facto experiment was designed to identify students who had begun their post-secondary programs during the years 1967-70.

The following fypotheses were tested: (1) there is no relationship between graduation and group membership for CP and VT graduates; (2) there is no difference between CP and VT graduates with regard to ACT scores in English, mathematics, social studies, and natural science, IQ, and high school class rank; (3) there is no relationship between graduation and group membership for VT students enrolled in related career, unrelated career, and transfer programs; Note: To develop the Joint Probability Index the next four hypotheses were tested: (4) there is no difference among the three VT groups with regard to the six variables; (5,6,7) there is no difference between the correlation coefficients of the six variables and zero for related, unrelated, and transfer programs. Chi-square and multivariate analysis of variance were the two primary statistical techniques used in the study.

The four important findings in the study were:

1. VT and CP students were significantly different with regard to the six intellective variables as measured by multivariate analysis of variance.

2. VT and CP students were not significantly different in their graduation and membership associations as measured by chi-square.

3. VT students enrolled in related, unrelated, and transfer programs at one college were not significantly different with regard to the intellective variables and graduation. The VT students at the other community college did differ significantly on the intellective variables and on the graduation and membership associations.

4. A sophisticated, efficient, and useful Joint Probability Index which combined the probabilities of group membership and success within that group could be developed.

It was concluded that although the CP and VT students differed on the six variables, they did not differ in their graduation and membership associations, suggesting that although the two groups were dissimilar, they were, in fact, similar in their persistence toward graduation. Also, approximately 46 per cent of the VT graduates enrolled in related community college programs; 21 per cent in unrelated career programs; and 33 per cent in transfer programs. Finally, the Joint Probability Index appears to be an effective tool for counseling and advising purposes because it is derived from student characteristics (intellective variables) as well as from the probabilities of membership in a group and success conditioned by membership.

Order No. 73-23,800, 180 pages.

34: 1644-A Oct '73

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Horvath, William,
(Last name) (First name) (Middle name)

Exact Title The Development of a Model of Information Needed for Long-Range Planning of Vocational-Technical Programs of Education

Degree granted Ph. D., Date 1972, No. of pages in report 112

Granted by The University of Wisconsin Madison, Wisconsin
(Name of institution) (City, State)

Where Available: Microfilm (z) Microfich ( ) E.R.I.C. ( )

The Problem

The ever increasing expenditure on education has brought public awareness and concern to bear upon the degree to which these funds are utilized effectively.

Administrators in vocational-technical education are faced with an exceedingly complex problem of appraising the effectiveness of present resource allocation and making realistic long-range plans for future change and improvement.

The general problem is what data and information are relevant to the development of effective long-range program plans in vocational-technical education?

Design of the Study

The basic plan of the study was to identify facts, information, or data that would be most helpful in developing realistic long-range plans for vocational-technical programs based on concrete objectives.

The literature that related to the problem as stated was thoroughly reviewed. Based upon the literature a tentative data model along with the criteria to evaluate these data was developed. The tentative data model and criteria were used to construct the survey instrument which was pre-tested and submitted to state and district directors. The responses were then tabulated, analyzed and evaluated. The findings were utilized to modify the tentative model, resulting in the model recommended for implementation.

Model application consisted of utilizing the model to compare the data actually used in a long-range state plan to that data which the model indicated would be most effective.

Tentative application of the model was made to develop a data system upon which to base an effective long-range program plan for vocational-technical education.

Major Findings

Selected findings from the study follow:

1. The most important information needed at both a state and district level for long-range vocational-technical program planning is information of the present and future market demand for occupational skills.
2. The principal use of market demand data was to assure that present and future skill opportunities made available are those with the greatest likelihood of being utilized.
3. Area labor (manpower) supply data would be utilized in long-range planning to coordinate training opportunities to market needs, thereby modifying occupational skill training opportunities.
4. It was found that three data categories--enrollment by occupation, vocational interest and population data--would be used primarily to plan for efficient resource use (faculty, equipment, and space).
5. State and district directors are reluctant to use secondary data in all categories except population data.
6. Both state and district directors placed strong emphasis on the use of student follow-up and placement data in long-range planning.
7. Long-range planning data needs to meet the vocational-technical training needs of isolated groups (handicapped, disadvantaged, etc.), required data other than those needed to plan for the general population. The respondents indicated a reliance on data from specialized governmental agencies and research specialists to provide information that would permit more efficient resource use in this area.

Implications

The findings of this study and the model developed provided administrators in vocational-technical education information about the data most relevant in resource allocation for effective program planning.

The criteria developed to measure the adequacy of existing and future long-range plans are related to the data most likely to assist in accomplishing the purposes for which the long-range plans are formulated. Order No. 72-23,741, 112 pages.

33: 6804-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Hudson, Donald, Wayne
(Last name) (First name) (Middle name)

Exact Title The Effect of Contiguity on Informational Achievement and Psychomotor Performance

Degree granted Ed. D., Date 1972, No. of pages in report 101

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to ascertain the relative effects of traditional contiguity, varied contiguity and integrated contiguity on the achievement of informational content and the performance of a psychomotor task.

The population for this study consisted of seventy-three students from grades five, six and seven of which sixty students were randomly selected from the upper and lower forty per cent of the I.Q. scores. This investigation was conducted using a randomized block design wherein the independent variable was the type of contiguity provided in relating informational content and psychomotor activity. The dependent variables were informational achievement as indicated by a cognitive test and psychomotor performance measured by evaluating a completed psychomotor task.

The informational content selected for this study pertained to series-parallel circuits and basic radio theory. The two-part psychomotor task consisted of assemblying a series-parallel circuit and a crystal radio set.

Analyses of the two circuits were performed in an effort to identify the (1) technical related information (2) manipulative sequence and (3) theoretical concepts for use in the three presentations. From these analyses, a script was written for each of the three treatments and a slide series was prepared.

As specified by the treatment, each student was exposed to identical presentations of content and performed identical psychomotor tasks with differences only in contiguity. Traditional contiguity was provided by presenting theory followed by technical related information and psychomotor performance. Varied contiguity was attained by presenting technical related information, and performance of the psychomotor task followed by presentation of theoretical concepts. Integrated contiguity was provided by presenting segments of technical related information, theory and psychomotor performance.

A two-way analysis of variance was computed for cognitive test scores and psychomotor task scores. The analysis revealed a significant difference among treatment mean scores for the cognitive test. A Tukey (B) posteriori test among multiple means revealed that the mean score for the treatment group receiving varied contiguity was significantly higher than the mean for the group receiving integrated contiguity. There was a significant difference between the high and low mental ability groups but there was no significant interaction between mental ability and informational achievement.

Analysis of the psychomotor performance scores revealed no significant difference among treatment mean scores. Also, there was no significant difference between the psychomotor scores of the high and low mental ability groups. There was no significant interaction between mental ability and psychomotor performance.

In view of the finding of a significant difference among the mean scores of informational achievement, it was concluded that the achievement of students exposed to traditional contiguity or varied contiguity will be higher than the achievement of students exposed to integrated contiguity. Educators can expect students of high mental ability to have a higher level of informational achievement than students of low mental ability.

Since there were no significant differences among treatment mean scores for psychomotor performance, it was concluded that psychomotor performance is not effected by contiguity. Educators can expect no significant difference in psychomotor performance between students of high mental ability and low mental ability.

Order No. 73-21,850, 101 pages.

34: 1112-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Hyde (Last name), Thomas (First name), Eugene (Middle name)

Exact Title Scales for Predicting Student Success in High School Vocational Programs

Degree granted Ph. D., Date 1973, No. of pages in report 128

Granted by The Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The study tested the predictive validity of the author's placement/selection Hyde-Scales. The objective was to ascertain whether, from prescreened students who had expressed a desire to enroll in a particular vocational program, the students could be objectively and reliably counseled and those who could best benefit be placed in that particular program. The study sought to determine the relationship between students' scores on the Hyde-Scales and their performance in their respective vocational courses.

The study involved approximately 400 students at three Ohio schools in the areas of Auto Mechanics, Cosmetology, Child Care, Distributive Education, Occupational Work Experience, Drafting and Stenography.

The use of the Hyde-Scales as a performance/prediction tool is an attempt to objectively record and relate all variables which guidance personnel normally evaluate as they interview and counsel students. The criteria include certain standardized tests and academic grades, and other variables which the author or school feel are predictive; e.g., attitude, program interest, teacher and counselor recommendations, motivation.

The scales were developed by each school's guidance department with the author's help. Scales were constructed for each program, using the criteria available to that school, weighting the criteria with point values on a dual scale or Hyde-Scale approach.

At the end of the 1971-72 school year the counselor ranked the students that had selected each taxonomy being investigated. The counselor applied the appropriate Hyde-Scales to these students. This score gave each student a rank predicting his success in that program.

At the end of the 1972-73 school year the instructor ranked his students relative to his desire to employ each student, and ranked each one's academic performance in the course.

The four basic variables evaluated were the Hyde-Scales (H-S), the counselor's prediction (C-P), the student's job projection (J-P), and the student's grade average (G-A). The data was evaluated with the Spearman rank correlation (RHO) and the Kendall coefficient of concordance.

The study examined the relationship between the students' scores on the Hyde-Scales and the counselor's ranking of the students' probable performance in the vocational course, as well as the relationship between the counselor's ranking of the students' probable performance and the students' actual performance (as measured by grade average and instructor ranking). Similarity of the correlations in all the vocational areas tested suggests that the Hyde-Scales could prove valuable as a generalized prediction instrument for any school offering vocational programs, and actually correlated high in ten of 14 applicable cases.

Conclusions concerning the value of the Hyde-Scales are:

(1) The Hyde-Scale correlated with the performance variable (combination of J-P and G-A) at an overall level of .62 in the skill areas, with the highest individual taxonomy correlation in Drafting at .89.

(2) The Hyde-Scale could outpredict the counselor. The predictive ability of the Hyde-Scale (by consensus) was superior in 14 cases; the counselor, in four.

(3) The construction of a Hyde-Scale made it possible to convert any subjective criteria to objective criteria.

(4) Because they had a part in it and understood the process, instructors were more satisfied with the selection system and better accepted the students selected for each program. Thus greater rapport grew between guidance and teaching personnel, brought about by working together on the scales.

(5) The Hyde-Scale approach is easily adapted to almost all the information used in any school guidance system and, thus, enables the counselor to document his counseling and rationale for placement of each student without unreasonable use of additional time or money.

(6) Counselors felt more secure with the scales which afforded them objective backing.

(7) An independent study found it significant (below the .05 level) when the Hyde-Scale score was compared to employment of graduates relative to their area of training.

Order No. 73-26,847, 128 pages.

34: 2473-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Ilyas (Last name), Muhammad (First name), (Middle name)

Exact Title Business Teacher Education in the United States, England, and West Pakistan

Degree granted Ph. D., Date 1970, No. of pages in report 387

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This was a study of selected aspects of pre-service business teacher education in the United States, England, and West Pakistan. Aspects selected for the study included philosophy and objectives of the programs; organization, administration, and supervision; and curriculum practices.

The primary purpose of the study was to determine successful principles, practices, and procedures (especially in the two advanced countries generally considered to have well developed programs of pre-service business teacher education) some of which might be adapted to improve pre-service business teacher education in West Pakistan.

The Procedure

The study of pre-service business teacher education was based upon data obtained from three major sources: (1) literature and research available dealing with the specific aspects considered for each of the three countries (2) departmental minutes or memoranda and official bulletins of selected educational institutions having pre-service business teacher education programs, and (3) visits to selected business teacher education institutions, which made it possible for the investigator to observe these programs and have interviews with the administrative and instructional personnel involved in them. Observations and interviews, both in the United States and abroad, were recorded through note-taking and by tape recorder. The data gathered were used as the basis for the report describing business teacher education in the three countries.

General Statement of Findings

It was found that considerably more attention has been given to setting forth well defined philosophy and objectives in the United States than in either England or West Pakistan, but that both of the latter countries are now giving considerable thought to the direction in which pre-service teacher education should go. The patterns of organization, administration, and supervision among the three countries are quite different, reflecting the difference in their cultures and patterns of their total educational programs. In each of the three countries, the attempt is made to provide some balance in the education of business teachers by requiring that programs require the prospective business teacher to complete work in general education business subject-matter, and professional education. Certain principles and practices adhered to in the United States and England have implications for the improvement of pre-service business teacher education in West Pakistan.

Order No. 70-15,541 M $4.95; X $17.55. 387 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Indresano (Last name), Joseph (First name), Patrick (Middle name)

Exact Title A Comparison of Pupil Achievement and Pupil Attitudes in Two Industrial Arts Curricula United States Dependents Schools, European Area

Degree granted Ed. D., Date 1973, No. of pages in report 108

Granted by University of Southern California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose:

The purpose of this study was to evaluate the effect of the Industrial Arts Curriculum Project's "The World of Construction" as compared with the effect of traditionally taught industrial arts on both cognitive development and attitudes toward industrial arts of junior high school students enrolled in industrial arts within the United States Dependents Schools, European Area (USDESEA). A control group of comparable students who were not enrolled in industrial arts also was compared in the cognitive domain of learning.

Methodology:

The student sample consisted of 148 "World of Construction" students, 141 students of traditional programs, and 138 non-industrial arts students. Schools were selected so that there was a similar distribution of father's rank in each group. The two cognitive measures, administered to all three groups, were the IACP-developed The World of Construction Comprehensive Examination and the Educational Testing Service's General Industrial Arts Test. Attitudes of the two industrial arts groups were measured by the General Scale of Attitudes of Junior High School Industrial Arts.

A modified posttest-only control group design was selected. The independent variable in the study was curriculum. The dependent variables were cognitive achievement and attitude. At the Computer Center of the University of Southern California the data were subjected to multiple t-tests, with reading scores, mathematics achievement scores, verbal I.Q. and nonverbal I.Q. scores as covariates for the cognitive data.

Findings:

Significant differences at the .01 level were found in favor of "The World of Construction" students over traditional and non-industrial arts students on The World of Construction Comprehensive Examination, and in favor of both industrial arts groups over the control group on the General Industrial Arts Test. There were no significant differences between the two industrial arts groups on the traditionally oriented General Industrial Arts Test of in attitudes, or between traditional and non-industrial arts students on the IACP instrument. Scores on both cognitive measures correlated rather highly with reading levels.

Conclusions:

Findings indicated that of the three test instruments utilized, only the test related to "The World of Construction" content discriminated between students of the new program and students in traditional classes. The following conclusions also were indicated: (1) Non-industrial arts students in USDESEA failed to obtain the knowledge of tools and machines commonly taught in industrial arts courses. (2) In the area of cognitive achievement, "The World of Construction" could be considered a successful curriculum for USDESEA students.

Recommendations:

The following recommendations are offered: (1) Cognitive measures dependent upon reading ability should be utilized with caution in industrial arts classes. (2) It is suggested that the IACP curricular program be implemented more extensively and that industrial arts courses be made available to all USDESEA junior high students. (3) There are implications for further research into the IACP instructional program, as well as into other innovative industrial arts programs, attitudes towards industrial arts, and needs of non-industrial arts students.

Order No. 73-14,413, 108 pages.

34: 160-A July '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Iqbal, Mohamad,
(Last name) (First name) (Middle name)

Exact Title Study of the Forces that have Influenced the Development of Vocational Education in the United States of America and Implications for Vocational Education in Pakistan

Degree granted Ed. D., Date 1972 No. of pages in report 178

Granted by Indiana University Terre Haute, Indiana
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfiche ( ) E.R.I.C. ( )

Problem: The problem of this study was: (1) to discover the forces that influenced the development of vocational education in the United States; (2) to give the status of vocational education in Pakistan; (3) to describe the major forces effecting the development of vocational education in Pakistan; and (4) based upon the three mentioned areas to, make recommendations for the improvement of vocational education in Pakistan.

Procedure: The history of vocational education in the United States was traced for the purpose of identifying the forces that influenced the development of vocational education in the U.S. A description of vocational education in Pakistan was made. Major forces were studied in the perspective of Pakistani society. Based upon the study of developmental history of American vocational education and the analysis of the social forces operating in the Pakistani society, conclusions were drawn. From the conclusions, recommendations were developed for vocational education in Pakistan.

Findings and conclusions: (1) Many forces--political, demographic, economic, social, and technological--have had influence upon the development of vocational education both in the U.S. and Pakistan. (2) Education in Pakistan has been accepted as an investment in human resources, therefore planning takes place at the central level in order to increase the investment and improve the economic growth of the country. (3) In Pakistan vocational education does not generally form part of the secondary school program. It is imparted in a variety of institutions under different auspices and with different philosophies. (4) The two countries differ in terms of philosophy of vocational education. In the U.S. it is designed to meet the needs of both individual and society. However in Pakistan, society's needs seem to be the only rationale for vocational programs. (5) Vocational education in the U.S. is carried out under public supervision and control. In Pakistan, it is controlled by government agencies. (6) In the U.S., public interest, professional and political organizations, and government agencies have played a significant role in the promotion of vocational education in the country. Whereas in Pakistan, general public, and professional organizations have had little impact upon the planning and functioning of vocational education.

Recommendations: Attention should be given by those in policy-making positions to the strides made in vocational education in the U.S., as pointed out in this study, with particular reference to the forces which brought about change in vocational education in Pakistan. (2) Non-formal avenues of training should be provided for those students who do not go into secondary education or will drop out from schools, or migrate to urban areas to seek jobs in industrial occupations. There is a need to make vocational programs relevant to Pakistan's essentially agricultural economy. (3) Retraining of administrative and specialized personnel is essential for efficient operation of vocational programs. To keep up with modern developments in other countries, exchange programs should be worked out with countries which have developed vocational systems of education. (4) In order to get public participation and cooperation, authority should be delegated to the lower echelon of administration. Experimentation should be carried out which would place responsibility for curricular development at the local level. (5) Since professional organizations have had impact upon the development of vocational education in the U.S., measures should be taken to provide a forum for such professional groups in Pakistan. Order No. 73-10,830, 178 pages.

33: 6249-A May '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Irwin (Last name), Jack (First name), Lewis (Middle name)

Exact Title An Investigation of the Effects of Student Self-Evaluation and Marking on Achievement of Cognitive and Affective Objectives of a Basic Mechanical Drawing Course

Degree granted Ed. D., Date 1973, No. of pages in report 144

Granted by The Pennsylvania State University (Name of institution) University Park, Pennsylvania (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The experimental aspects of this research measured the effect of cognitive and affective achievement of systematic self-evaluation by students of their work in beginning mechanical drawing classes. The system used involved both process and end-product evaluation and allowed each student to substantially determine his course grade.

Three high schools, five teachers, and two-hundred-sixty-six students comprising fourteen classes participated in the study. Each teacher had an equal number of classes assigned to "control" and "experimental" treatments with students in the former being evaluated in the traditional way by their teacher and those in the latter evaluating themselves. The experimental phase of the study operated through an entire school year and produced the following results.

By analysis of variance of paired treatment means --

(1) superior cognitive achievement of self-evaluating classes was found to be significant.
Obtained F = 13.333 with 1 and 6df.
(See note below)

(2) superior affective achievement of self-evaluating classes was not found to be significant.
Obtained F = .5557 with 1 and 6df.

Note: Superior cognitive achievement of self-evaluating classes must be accepted with reservation because efforts to control the student variable "IQ" were found to have failed. Data collected at the conclusion of research showed experimental classes having higher mean IQ's.
Obtained F = 12.957 with 1 and 6df.

While a true test of the major hypothesis of this study was confounded by the failure to control the IQ variable, the viability of self-evaluation as an alternate procedure for determining grades was demonstrated. Further, both teachers and students who used the system suggest it has other positive values which this study did not attempt to quantify but which constitute possibilities for further research.

Order No. 73-24,013, 144 pages.

34: 1484-A Oct '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Israel (Last name), Everett (First name), Nelson (Middle name)

Exact Title An Examination of Nonverbal and Verbal Instructional Guidelines In Students Developing Abstract Understanding of Technical Concepts

Degree granted Ed. D., Date 1972, No. of pages in report 481

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This research was conducted to determine the premise for using instructional guidelines which would enable junior and senior high school students to develop an abstract understanding of a technical principle (concept). The means for accomplishing this involved studying the effect verbal and nonverbal instructional media had on concept learning.

The problem was to determine if the verbal instructional medium complementing the nonverbal instructional medium (NV + V_c) would result in students developing a higher level of abstract understanding of a pre-selected technical concept than the use of the verbal instructional medium (V) alone or the verbal instructional medium supplementing the nonverbal medium (NV + V_s). The three instructional guidelines were based upon approaches suggested by Gagné. The role of the verbal and nonverbal instructional media were operationally defined by the use of Gagné's hierarchy of learning conditions and subordinate hierarchy.

The study was based upon the need for students to develop a higher level of abstract understanding of industrial arts subject matter. This premise was based upon a review of literature related to major industrial arts curriculum plans developed during the last fifteen years.

The procedure used for conducting the study involved (a) selecting a technical concept, (b) developing a subordinate hierarchy, (c) writing test materials to measure abstract learning, (d) writing scripts and producing video-taped lessons, (e) determining the reliability of the tests, (f) identifying the sample, (g) collecting the data, and (h) analyzing the data. The testing materials consisted of a final task test, a transfer test, and a learning achievement test. The final task test was designed to determine the ability of students to interrelate the attributes of a technical principle into a meaningful whole. The transfer test determined the students' abilities to use their newly-acquired cognitive capabilities to solve contextually-related problems. The amount of verbal knowledge the students acquired was measured by the learning achievement tests. The final task and transfer tests were designed to measure the amount of abstract learning.

Data collected were analyzed (a) by determining significant differences between the NV + V_c, V, and NV + V_s treatment means on each test at the junior and senior high school level and (b) by determining if treatment was a significant variable for predicting student performances on the three tests. At the junior high school level, the NV + V_c and V treatment means on the learning achievement test were significantly different from the NV + V_s mean. There was no significant difference between the NV + V_c and V means. No significant differences were determined between the three treatment groups on the final task and transfer tests. Treatment was identified as a significant variable for predicting student performances on the learning achievement test. At the senior high school level, the NV + V_c and V treatment means were significantly different both from each other and from the NV + V_s mean for all three tests. Treatment was identified as a significant variable for predicting student performances on the three tests.

The results of the study indicated that (a) the guidelines used to plan the verbal medium complementing the nonverbal medium (NV + V_c) lesson resulted in students acquiring the largest amount of abstract understanding of a technical principle and (b) intellectual maturation had an effect on students' abilities to develop an abstract understanding of a technical principle. The identification of the NV + V_c instructional guidelines could help industrial arts teachers become aware of the need to (a) discriminate differences between the subject matter of industrial arts and instructional procedures and (b) interrelate unique characteristics of both in order to develop a teaching strategy which emphasizes abstract learning.

Order No. 73-823, 481 pages.

33: 3343-A Jan '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Jabbari (Last name), Ebrahim (First name), G. (Middle name)

Exact Title A Plan of Trade and Industrial Education for Iran Based on Trade and Industrial Education Programs in the United States

Degree granted Ph. D., Date 1972, No. of pages in report 229

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to develop a plan of trade and industrial education for Iran. This study was threefold: (1) to determine the need for a trade and industrial education program in Iran; (2) to design a functional program to meet the needs for training skilled manpower for Iran: and (3) to make suggestions for the implementation of a trade and industrial education program in the educational system of Iran.

Data for the study were obtained through: (1) questionnaires responded to by selected trade and industrial education specialists in the United States: (2) available literature concerning trade and industrial education programs in the United States; (3) available literature and statistical information concerning Iranian general, vocational and technical education; and (4) surveys and reports published by UNESCO, the United Nations, and the Agency of International Development. Through an analysis of the materials collected, relevant data for the problem of the study were used as a foundation in developing a plan of trade and industrial education which could be beneficial to Iran.

From the evidence revealed by the study it was concluded that it is necessary to plan trade and industrial education programs to solve the needs for skilled manpower and the educational needs of individuals in Iran. This study further revealed that selected procedures and characteristics utilized by trade and industrial education in the United States are applicable for establishing a trade and industrial education program for Iran. These selected procedures and characteristics may be adapted to meet the needs of the educational system as well as to fit the requirements of various geographical localities. Adjustments need to be made so that trade and industrial education programs are not segregated, but offered at each level of education in Iran. Guidance and counseling services need to be extended from the junior high through all educational levels so that students will be directed into the programs best suited to their needs and interests. Finally, the proposed model plan may be used as a guide to implement the curriculum as set forth in the educational reform to serve the students with a broad range of interests and abilities.

On the basis of the conclusions drawn it was recommended that Advisory Committees be organized on state and local levels for the purpose of bringing together education, management, industry, labor, employment services and professional people and representatives from other groups who are concerned with the welfare of the students and the needs of industry and the national plan for economic development. Provisions should be made to enable students to transfer from one type of educational program to another, particularly between vocational and academic education without the restrictions of a qualifying examination. For the schools that are not equipped with an adequate amount of laboratory facilities, mobil unit facilities, or some type of area schools should be initiated. Steps should be taken through the Iranian Ministry of Education to authorize school administrators to establish an employment office for the purpose of placing trade and industrial graduates into an entry level job according to the training they have received. Finally, this study be considered by the Iranian Ministry of Education and the Division of Manpower Development for possible implementation with the hope that trade and industrial education becomes an integral part of the total educational program in Iran.

Order No. 73-21,789, 229 pages.

34: 1112-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Jacoby (Last name), Walter (First name), (Middle name)

Exact Title Policies and Practices in the Administration of Multiple-Teacher Vocational Agriculture Departments in the United States.

Degree granted Ph. D., Date 1961, No. of pages in report 298

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose.--To assess the present and desired levels of participation of administrative agents dealing with policies and practices in the administration of multiple-teacher vocational agriculture departments in the United States.

Method.--Inquiry forms were mailed to 209 school administrators and 210 teachers of vocational agriculture in 419 high schools in continental United States and Hawaii considered to have multiple-teacher vocational agriculture departments. Two hundred and seventy-nine usable inquiry forms were returned. Data were collected regarding the status of multiple-teacher vocational agriculture departments, present and desired extent of participation of administrative agents dealing with existing and desired policies and practices and administrative practices in use and desired.

Findings and interpretations.--The administration of multiple-teacher vocational agriculture departments should be of concern due to the problems encountered because of school size, extensive facilities, scope of the educational offerings, number of people served and number of individuals involved in the administrative processes.

The roles of the administrative agents, advisory council, superintendent, principal, department head, other teacher(s) and all teachers, varied from school to school as well as by policy and practice. Depending upon the organizational structure in use, the department head and all teachers have emerged into strong administrative roles, followed in order by the principal, other teacher(s), superintendent and advisory council. The advisory council and other teacher(s) participate more extensively in curriculum policies and practices than they do in general or personnel policies and practices. The superintendent and principal participate at a high level in personnel policies and practices.

There is in fact the desire for a continued democratic approach in the administration of multiple-teacher departments. No sharp differences were evident between responses of administrators and teachers.

All administrative agents should understand the policies and practices in which they might play a more important role, including the following possibilities:

Advisory council--attending meetings of the board of education; suggesting new or changed administrative policies to the board of education and practices to the superintendent; formulating objectives for the department; reviewing the curriculum, courses of study and FFA program-of-work; formulating standards for farming programs; deciding what courses to offer for young and adult farmers.

Superintendent--attending meetings of the advisory council; selecting the FFA Chapter Advisor; reviewing the curriculum, courses of study and FFA program-of-work; deciding what courses to offer for young and adult farmers.

Principal--attending meetings of the board of education and advisory council; suggesting new or changed administrative practices to the superintendent; selecting the FFA Chapter Advisor; reviewing the curriculum, courses of study and FFA program-of-work; deciding what courses to offer for young and adult farmers; making classroom visitations.

Department head--attending meetings of the board of education; suggesting new or changed administrative policies to the board of education and practices to the superintendent; making classroom visitations; authorizing purchases.

Other teacher(s)--attending meetings of the board of education; suggesting new or changed administrative practices to the superintendent.

All teachers--attending meetings of the board of education; suggesting new or changed administrative practices to the superintendent; authorizing purchases.

Respondents favored increased use of the policies and practices of having: an advisory council; a designated department head; special teachers for young and adult farmer classes; weekly or monthly calendars of teaching duties; vocational agriculture students enrolled from other school districts with high schools; teachers whose specialties match the situation provide on-farm instruction; students grouped according to the vocational objectives; school year employment for some teachers; a reduced teaching load for the department head.

Microfilm $3.85; Xerox $13.50. 298 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Jobe (Last name), Max (First name), Edward (Middle name)

Exact Title Administrative Aspects of State Advisory Councils on Vocational Education

Degree granted Ed. D., Date 1972, No. of pages in report 83

Granted by University of Georgia (Name of institution) Athens, Georgia (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to determine the relative importance of selected functions of State advisory councils on vocational-technical education. The study attempted to determine the probability of accomplishing these functions with select staffing patterns and administrative organizations as perceived by State directors of vocational education and chairmen of State advisory councils on vocational education.

The findings of this study may be of value to those persons responsible for State advisory councils on vocational education in determining appropriate functions and administrative organizations for their councils. The study may be of value to other lay advisory groups to governmental agencies.

The findings of the study indicated a general agreement on the relative importance of the nine selected functions for State advisory councils as perceived by the advisory council chairmen and the State directors of vocational education. Both groups chose the function--evaluation of programs, services, and activities--as the most important, and the function--advising the State board in developing a State plan--as the second in importance. The two groups were in agreement in selecting the function--advising in policy matters in the administration of the State plan--as the least important.

The council chairmen were unanimous in the selection--full-time staff responsible only to the advisory council--as the best staffing pattern. Although they were not unanimous, the directors chose the same staffing pattern.

The chairmen chose the administrative organization--an independent State agency created by State statute--as their first choice. The directors chose the identical administrative organization.

In conclusion, both groups agreed that the advisory council should have a full-time staff responsible only to the advisory council, and that the council should be an independent State agency created by State statute.

It was apparent from the literature reviewed that Congress intended an important role in vocational education for the advisory councils by legislating certain functions and appropriating monies for their use. The survey confirmed the importance of the advisory councils as perceived by council chairmen and State directors in selecting a staffing pattern and an administrative organization that would provide for an independent council with staff. Order No. 72-34,094, 83 pages.

33: 3241-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Johnson (Last name), Carl (First name), Robert (Middle name)

Exact Title A Comparison of Mobile Home Dwellers with Conventional Home Dwellers and its Effects on Education

Degree granted Ph. D., Date 1972, No. of pages in report 92

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to compare the entire mobile home population of the town of Hartford, Vermont, with a randomly selected group from the conventional home population within the same town to answer the following questions:

1. Is the enrollment of students from the mobile home population increasing at a greater rate than the enrollment of students from the conventional home population by grade level, and in total?

2. Do differences exist between the mobile home dwellers and the conventional home dwellers in the financial support level per student in terms of revenue raised by property taxes?

3. To what extent will the findings suggest the need for changes in support patterns for all public education, with particular emphasis on vocational education, since it is inherently more expensive and has a unique funding feature?

RESEARCH DESIGN

The study examined the entire mobile home population and a randomly selected group from the conventional home population for the years 1960, 1963, 1966, and 1969.

Student per home ratios were determined for each population, and these were compared to develop a comparative student per home ratio (students per mobile home divided by students per conventional home).

Financial support levels from each population consisted of total real estate property taxes paid. Demands were considered to be the actual costs of educating the children from each population. A support/demand ratio, on a per student basis, was then determined for each population. A comparative support/demand ratio, which compared the mobile home support/demand ratio to the conventional home support/demand ratio was then determined.

RESULTS

Question #1-The enrollment of students from the mobile home population was found to be increasing at a significantly greater rate than the enrollement of students from the conventional home population.

A decrease in numbers of students at the elementary level in the final year of the study, for both populations, may indicate an end, or at least a respite from, continually increasing enrollments.

The comparative student per home ratio increased from .23 to .40 during the period of the study.

Question #2-The financial support level indicated that during the entire period of the study the mobile home dwellers more nearly met the costs of educating their children than did the conventional home dwellers. However, the mobile home support level has dropped during each year of the study while the conventional home support level has remained relatively stable.

Question #3-There is a clearly mandated need for changes in support patterns for education. The increasing student per home ratios from the mobile home population, which adversely influence the financial support level, illustrate the need for change. These factors when coupled with other increased costs spell out the need for prompt and remedial action.

CONCLUSIONS

The comparative student per home ratio has increased from .23 to .40 during the study. This is significant at the .05 level using nonparametric testing (chi square).

The comparative support/demand ratio has decreased from 1.69 to .[illegible] during the study. This was caused by the increase in enrollment from the mobile home population, and a built in depreciation factor used in assessing mobile homes.

If these two counter trends continue, a disparity of enormous magnitude will soon be created between the support/demand ratios of these two populations.

Order No. 72-32,224, 92 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Johnson, Duane, Allan
(Last name) (First name) (Middle name)

Exact Title Organization, Administration, and Operation of Area Vocational-Technical Schools in South Dakota, 1963-1971

Degree granted Ed. D., **Date** 1972, **No. of pages in report** 166

Granted by University of South Dakota Vermillion, S. Dakota
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purposes

The purposes of this study were to identify and compare area vocational-technical school characteristics concerning the organizational structure, administrative positions, instructional programs, course offerings, and budgeted expenditures at the local level and the organizational structure and administrative positions at the state level in South Dakota for school years 1963-64 through 1970-71.

Research Questions

Nine research questions were utilized in the study concerning (1) statutory bases, (2) organizational structure, (3) identification of local and state administrative positions, (4) job descriptions, (5) program identification, (6) levels of program offerings, (7) characteristics of comparable programs, (8) attendance and service areas, and (9) levels of financial support.

Procedures

An interview technique and a questionnaire were developed and utilized in this investigation. An interview guide and a vocational education description questionnaire were developed by the writer and tested in a pilot study. Interviews were conducted with five area vocational-technical school directors and the State Director of Vocational Education utilizing the guide. The questionnaire was introduced in discussion and left with participants for completion and return by mail.

Federal and state statutes were reviewed to determine the legal basis and requirements for area vocational-technical education in South Dakota. Area vocational-technical school catalogs and bulletins were utilized to identify programs and course offerings for each school.

Findings

The South Dakota State Board for Vocational Education designated six areas in 1965 and approved construction of an area vocational-technical school in five areas.

The organizational structure at the state level included a State Board for Vocational Education, a Vocational Advisory Board, and a State Division for Vocational Education. At the operational level area vocational-technical education was a component of the public school district in which the school was located.

Written job descriptions for administrative positions within the State Division of Vocational Education were available according to job titles but were not available in the area vocational-technical schools. However, according to verbal descriptions, directors' positions were similar from one area school to another.

Forty-nine post-secondary vocational-technical programs were offered within area vocational-technical schools, with six programs offered at more than one area school. Forty-six secondary school vocational courses were offered by four area schools.

School districts provided 53 percent and the federal government 47 percent of the funds for area vocational-technical school construction during the period covered. Operation and maintenance expenditures consisted of 40 percent local school district funds and 60 percent in combined state-federal funds during the period 1967-71.

Conclusions

In general, conclusions which related to area vocational-technical education in South Dakota and were based on the findings of the study were:

1. Federal aid to vocational education through the Vocational Education Act of 1963 and the Vocational Amendments of 1968 has supplemented state and local financial efforts.
2. Regional boundaries appeared to limit numbers and distribute locations of area vocational-technical schools within the state.
3. State level administrative job titles were appropriately described in writing.
4. Administrative positions at the local level were not well defined since written descriptions were not available.
5. The concept of area vocational-technical educational programs for secondary school students was not supported by existing provisions made.
6. Attendance areas were not coterminous with established service boundaries at the post-secondary or secondary level.

Recommendations

Recommendations which were based on the findings and conclusions of this study were as follows:

1. Six area school boards for vocational-technical education should be established within the state.
2. Area vocational-technical education school boards, once established, should have authority to employ an area director and to levy taxes.
3. Studies should be conducted to provide a systematic plan for developing job titles and descriptions within area vocational-technical schools.
4. A statewide study of area vocational-technical education should be conducted to determine:
   - a. Needs for the extension of secondary courses;
   - b. Feasibility of residential schools;
   - c. Feasible approaches to area school boards;
   - d. Curriculum guidelines;
   - e. Cost benefits of program offerings.

Order No. 72-32,711, 166 pages.

33: 2650-A Dec '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Jones, Homer, William
(Last name) (First name) (Middle name)

Exact Title An Investigation of the Effects of Feedback on Variability and Central Tendency of Group Opinion While Employing the Delphi Technique

Degree granted Ph. D., Date 1973, No. of pages in report 119

Granted by Oregon State University Corvallis, Oregon
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to determine the effects of the Delphi Technique on two types of judgment; factual judgment and value judgment. Other considerations were the effect of the process on mean response and variability of response.

In testing the Delphi Technique this study arrived at five definite conclusions: 1. The Delphi Technique did not promote a significant change in mean response to factual judgment items. 2. The Delphi Technique did not promote a significant change in mean response to value judgment items. 3. The Delphi Technique did not produce a consistent change in variance of response to factual judgment items. 4. The Delphi Technique did not produce a significant change in variance of response to value judgment items. 5. The Delphi Technique caused a reduction in the number of responses to the last survey in the process. In addition to these five conclusions there were some noteworthy observations about the procedure of the Delphi Technique. The most outstanding observation was the fact that the investigator was continually facing a time deadline for analyzing the results of the first survey in order to provide feedback for the second survey. The investigator was faced with the same rush schedule to analyze the results of survey two in order to provide feedback for survey three. On top of being faced with a continuous rush schedule, the unavailability of a survey instrument necessitated a separate study to develop the research instrument for this study.

The Delphi Technique was used to identify the goals of the Industrial Education Department on the Oregon State University campus. Participants in the study consisted of five groups. The groups were: Industrial Education faculty, Industrial Education undergraduates, administrators of the School of Education, employers of Industrial Education graduate students and recent graduates of the Industrial Education department. Out of the five groups recent graduates and employers were deleted from the study due to their lack of response to the recurring surveys of the Delphi Technique.

The general Delphi procedure followed was: 1. A survey instrument was administered to the five groups of respondents. 2. The data provided were analyze to provide feedback for a age eighteen, and (12) General Aptitude Test Battery (GATB) scores.

Multiple regression techniques were used to examine the net relationships between the aforementioned variables and benefits associated with training. The t-test was used to determine whether the estimated coefficients were significantly different from zero. All statistical tests for significance were made at the 5 percent level ($p<.05$).

Findings: 1. The trainees in the MDTA courses were above average in education and work experience as compared to the general population of unemployed workers. 2. To fulfill the requirements of the Manpower Development and Training Act of 1962, it was concluded that the results of this investigation would enable improved decision making regarding training the hardcore unemployed. 3. Sixty-five percent of the trainees were employed in jobs unrelated to their training. 4. Trainees received negative benefits six months following. 5. Age, sex, number of dependents, labor market area, and prior labor force experience were major factors associated with benefits received from training. 6. The coefficient of multiple determination (R^2) for each model decreased as time following training increased. This indicated the possibility that variables other than age, sex, number of dependents, labor market area, and prior labor force experience were affecting benefits received from training.

Conclusions: 1. The trainees in the MDTA courses were above average in education and work experience as compared to the general population of unemployed workers. Therefore, the benefits accrued to the trainees tend to reflect their characteristics in terms of monthly gains. 2. To fulfill the requirements of the Manpower Development and Training Act of 1962, the results of this investigation indicate that additional efforts be made to match the assets of the "hard to place" trainees to a job. 3. Sixty-five percent of the trainees were employed in jobs unrelated to their training. Placement in jobs related to training showed that very little thought had been given to the ability of the labor market to absorb the trainees in a job related skill. 4. Trainees received negative benefits six months following. This fact suggests that trainees were meanifully employed prior to participating in MDTA programs. 5. Age, sex, number of dependents, labor market area, and prior labor force experience were major factors associated with benefits received from training. 6. The coefficient of multiple determination (R^2) for each model decreased as time following training increased. This indicated the possibility that variables other than age, sex, number of dependents, labor market area, and prior labor force experience were affecting benefits received from training. The effects of job experience and on-job training on earnings were in all likelihood being reflected, and in turn resulted in a lower R^2.

Order No. 73-21,803, 119 pages.
34: 2361-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Jussim, Estelle,
(Last name) (First name) (Middle name)

Exact Title Photogrpahic Technology and Visual Communication in the 19th Century American Book

Degree granted D. L. S., Date 1970, No. of pages in report 638

Granted by Columbia University New York, New York
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The impact of photography and its technologies on visual communication has scarcely begun to be measured. The pioneering work in the theory of the graphic arts, William Ivins' Prints and Visual Communication (1953)--one of the major sources for Marshall McLuhan's Understanding Media--has remained unchallenged, although many of its assumptions, hypotheses, and conclusions lack adequate documentation. By applying the constructs of James Gibson concerning the perception of the visual world, and of Abraham Moles concerning the application of information theory to aesthetics, it was possible to reformulate and test Ivins' valuable hypotheses about the nature and influence of photography and the phototechnologies.

To discover in what ways the introduction of photographic technologies altered the capabilities of the graphic arts for artistic expression and information transfer, three specific illustrators and one subject area were explored in depth. A chronological survey of the work of Howard Pyle (1853-1911) revealed that even the most imaginative and versatile illustrators could not escape the technological limitations of the new media, however much they could learn to capitalize on their advantages. A comparison of the pre- and post- photographic books by William Hamilton Gibson (1850-1896) raised major questions of the relationship between "artistic expression" and "scientific fact," and introduced considerations of "media confusion." A new approach to the puzzling career of Frederic Remington (1861-1909)--shadowed by discrepancies and myths which have obscured his aboslute dependence on photography--presented the inevitable conclusion that he was primarily an intermediary between the photograph and the printed page. Throughout, the problems encountered in the transmission of photography-from-Nature through type-compatible media provided considerable data on the conflict between the economics of publishing and artistic or technical goals.

The effects of the phototechnologies on the history of art history--Ivins' principle concern--were re-examined through carefully-matched sets of illustrations. Here, as elsewhere in the thesis, it became obvious that the message of the medium per se frequently obscures the message per se. Despite the fact that Ivins' theory that photography lacks a "syntax" is demonstrably naive, his concept of the "isness" of photography is amply verified in the transmission of messages about art objects.

As a control, the visual characteristics of publications of the Philadelphia Centennial (1876) era were compared with those of the World's Columbian Exposition (1893). Sampling of the years between these two major exhibitions unearthed a totally-neglected area which the present writer intends to pursue: that of the transitional book, in which the competition between wood-engraving and the phototechnologies created multimedia chaos.

The basic hypothesis of Ivins--that the great achievement of photography is that it alone bypasses the subjective distortions of both the packager of information (the illustrator) and the technological manipulator of codes (the engraver)--was discovered to be a gross oversimplification, as examples of communications needs for both the subjective evaluation of information and the subjective manipulation of codes could be found without difficulty. His subsidiary hypothesis--that the fine-screen process half-tone alone provided a printing surface using a subliminal code--is also a distortion of the complexities of the graphic arts, especially since other phototechnologies surpass that medium in many ways.

Despite these oversimplifications, however, other Ivins' contentions were significantly verified: (a) before photography, the distinction between pictorial expression and pictorial statements of fact went unrecognized; (b) the report of an event is more important than the event, since what we think about and act upon is most often the report and not the event itself. Since we cannot know of an event (in which we are not participants) except through a report, and since that report must rely upon culturally-accepted codes for its transmission, we are inescapably manipulated by the characteristics of codes.

Order No. 73-8957, 638 pages.

34: 801-A Aug '73

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author KEEP (Last name), ROGER (First name), L. (Middle name)

Exact Title A Comparison of the Teaching Activities Exhibited by Practical Arts and Business Education Teachers Who are Involved in Both Secondary School Education and Adult Education.

Degree granted Ed.D., Date June 1973 No. of pages in report 88

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where available: Microfilm ( ) Microfish ( ) E.R.I.C. ( )

Purpose of Study: the purpose of this study was three fold. One, to determine what the practical arts and business teacher, who teaches both secondary school and adult level education, perceived to be the teaching activities at each level; second, to determine what was actually taught at each level; and thirdly, to determine the relationship between what was perceived to be and what actually was.

Source of data and method of study:
The data was collected through a mailed survey and through observations. The mailed survey was to determine what the teachers perceived the teaching activities to be and the observations (using the Fahrlander Laboratory Observation Plan as the observation instrument) were to determine the actual teaching activities utilized. The survey and observation population consisted of teachers from school districts within Central California.

Findings and Conclusions:
The major conclusions of the study were:

1. The theoretical teaching activities of a teacher differ from the actual teaching activities of the same teacher in the secondary school classroom.
2. The theoretical teaching activities of a teacher differ from the actual teaching activities of the same teacher in the adult education classroom.
3. The theoretical teaching activities of a teacher in the secondary school classroom do not differ, with the exception of the non-supervisory activity, from the theoretical teaching activities of the same teacher in the adult education classroom.
4. The actual teaching activities of a teacher in the secondary school classroom differ, with the exception of the observation activity, from the actual teaching activities of the same teacher in the adult education classroom.
5. Contrary to what teachers believe, students do initiate the majority of the verbalizing activities.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Kemelgor (Last name), Bruce (First name), Howard (Middle name)

Exact Title A Study of the Occupational Mobility of Selected Electronics Technicians

Degree granted Ph. D., Date 1973, No. of pages in report 229

Granted by University of Illinois at Urbana (Name of institution) Champaign, Illinois (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purposes of the present study were to determine if there was a patterned, predictable occupational mobility existing among selected electronics technicians and to discover some possible educational, demographic, and psychological variables that would distinguish between the mobile and non-mobile. A questionnaire was mailed to approximately 600 technicians who graduated either four or five years ago from 30 different public community colleges and technical institutes located in five eastern states. The responses from 282 men were coded and computer analyzed according to Factor Analysis and discriminant analysis programs.

The results indicate that there exists a definite and apparently predictable occupational mobility wherein the individuals under study were differentiated by certain work context and occupational aspiration variables. That is, the mobile technicians appear to move from the performance of basic technical tasks such as circuit testing to analysis, design, sales and supervision, in part determined by their trouble-shooting and analytic abilities, and in part by their workplace aspirations relative to promotional opportunities and "getting ahead." In addition, much of the occupational mobility occurs as individuals move from one company to another with the finding that as people undergo such increasing shifts in their work-life, they concomitantly experience more supervisory responsibilities. What remain unclarified is the relationship between workplace shifts and motivational reasons for making such shifts. Though the latter dimension was beyond the scope of the present study, and any hypotheses in this regard must be subject to the aspirations analyses herein, the implication for future research in this area are numerous.

Support of the need for some minimum level of occupational specificity in studies of occupational behavior was certainly suggested by the present research. To have investigated a segment of "professional, technical, and kindred" workers would have unquestionably obscured much of what is central to the experience of the person and the structure of society. The label "technician" would be closer to reality since the education, tasks, life styles and organizational contexts would be in closer alignment. However, unless students of the area begin to specify particular occupations for study, e.g., electronics technician, the quest for understanding of occupational mobility in terms of career patterns and rewards, for example, will remain unattainable.

The importance of the educational experience cannot be underestimated, especially in the non-technical disciplines such as the social sciences and English. If the results of this study are to be generalized to all electronics technicians, then the relationship between these areas and the technical specialties become readily apparent. Especially for those students who appear to display high analytic ability, the need for additional study in the social sciences seems unquestionable. Perhaps if the educational institutions could demonstrate (with the aid of studies such as this) the relationship between, for example, English, psychology, and systems analysis, the oft-heard demands for relevance in the educational program could be substantiated and met.

Aside from these conclusions, which are made as a direct result of the study, and to avoid an over-simplified and erroneously generalized depiction of occupational mobility, several non-parisonious statements were also presented.

Order No. 73-17,576, 229 pages.

34: 596-A Aug '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Kiefer (Last name), Charles (First name), Candlin (Middle name)

Exact Title The Perceptions of Selected Male Public High School Seniors Concerning Specialized and Comprehensive Post-Secondary Schools in Minnesota

Degree granted Ph. D., Date 1972, No. of pages in report 147

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

STATEMENT OF THE PROBLEM

The problem was to determine the perceptions of selected male public senior secondary students relative to the specialized and comprehensive types of public two year post-secondary schools in Minnesota. The perceptions of factors which were inherent parts of either of these two organizations (school related factors) and factors which were not inherent parts of either of these organizations (non-school related factors) were also determined. Further, the relative importance of these school related and non-school related factors, as perceived by the students, was investigated.

PROCEDURES

An instrument was developed to elicit and measure student perceptions relative to Minnesota public two year post-secondary educational organization. The perceptions were concerned with the students' preferred school, attendance patterns, educational program patterns, and school factor and non-school factor importance.

The study was carried out in three Minnesota public secondary schools. The data were described separately for the vocational-technical and the non-vocational-technical students within each high school through the use of percentage coefficients, the chi-square statistic, and the normal approximation to the binomial.

CONCLUSIONS

1. In a free choice situation, a majority of the students (55 percent) have some preference for a specialized or a comprehensive school, while 45 percent of the students are "undecided." Under the free choice situation, and when the "undecided" students are forced to choose, more students prefer a specialized school than a comprehensive school (60 percent to 40 percent).

2. The students' attendance rate at public two year post-secondary schools is expected to be greater under the specialized or comprehensive system than under the present system. Thirteen percent more students would attend post-secondary schools under a comprehensive system, while 22 percent more students would attend under a specialized system than under the present system.

The students' educational program plans would be very stable if a specialized or a comprehensive system was established. Only seven percent of the students would change their educational program plans from those selected under the present system to another program area under a specialized system, while 10 percent would change under a comprehensive system.

3. The students perceive more advantages for their preferred school type (specialized or comprehensive) than for their unpreferred school type. Those who are "undecided" perceive a more nearly equal number of advantages for both school types.

There is much overlap among the school factors selected as advantages to the institution and the individual. There is less overlap among the factors selected by the vocational-technical and non-vocational-technical students as advantages for each school type.

The school factors selected more often as advantages for the specialized school include lower student cost, similar entrance requirements, homogeneous student body, better educational program transfer, variety of course offerings, and education like "real life" situation. Those selected for the comprehensive school include lower student cost, better educational program transfer, diverse faculty, variety of course offerings, heterogeneous students, education like "real life" situation, and heterogeneous programs.

4. The students are apt to change their school preferences to a greater extent under more extreme non-school conditions than under less extreme conditions. In terms of their effects upon changing the students' school preferences, the non-school factors of relative cost, program quality, student/faculty ratio, and placement completion ratio are perceived as more important.

5. The vocational-technical and the non-vocational-technical students, while different in some areas, are generally similar with respect to the perceptions under investigation.

6. The students in the Elk River, Fridley, and North Senior High Schools, while dissimilar in some areas, are generally similar with respect to the perceptions under investigation.

Order No. 73-1031, 147 pages.

33: 3160-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Kiker (Last name), Charles (First name), Milton (Middle name)

Exact Title Effect of an Experimental Program on Achievement in Pilot Training

Degree granted Ed. D., Date 1973, No. of pages in report 80

Granted by Texas Tech University (Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Unusual patterns found in grade records stimulated interest in the reason for wide fluctuations of scores of individual pilot training students. In one class observed, more than one student attained highest standing in his class on one set of grades and lowest class standing in his class on one set of grades and lowest class standing on another set of grades. Oddly, the student attaining the highest total score for flying and academic achievement never earned highest standing for a single check flight.

The erratic pattern of grade records seemed to reflect probable inconsistency of effort. It appeared possible that low scores caused increased effort and that high scores resulted in decreased effort. The problem, then, was to develop a procedure, method, or technique that would encourage consistency of effort. The purpose of this study was to develop such a plan and test it.

It is an accepted fact that being a part of a special, experimental group has an unusual effect on performance. This principle was employed in the conduct of this research. Also, the experimental class was provided some information about the problem and about student grades. After an introduction to the plan of study, the class was informed of scores on each academic examination, each check flight, cumulative raw scores, and percentage grades of each section and of each class included in the study.

Four null hypotheses were tested in an attempt to determine effects of the experimental program on (1) level of student's grades, (2) fluctuation of flight check grades, (3) fluctuation of academic grades, and (4) correlation between selected flight scores and related academic grades.

Students for the experimental group and each control group were selected and assigned by a random selection method. The plan was developed to insure equitable distribution of the students to the various installations conducting training.

Normally, when any academic examination was administered each student left the room when the test was completed. While papers were being graded, the class members were informed about their own progress and comparisons with control groups. In this way, no extra student time was required for this study.

Considerations of the study included the total number of responses made by each class, the number of correct responses, and percentage grades of the experimental group and of each control group. Data included current test scores and cumulative averages. Coefficients were calculated to determine correlations between most closely related pairs of academic grades, between pertinent academic scores and appropriate flight grades, and between pertinent academic scores and cumulative flying grades.

Consistency of flight check and academic grades was significantly improved over control groups and over other classes observed. Correlation between flight scores and related academic grades was significantly higher with the experimental group. The experimental class also earned higher check flight grades than did the control groups.

The study is adaptable to any teaching/learning situation where objectives are well defined and objective, standardized examinations are used. It is most readily adaptable to the various types of training conducted by the Armed Services. The experimental treatment had a positive effect on attitudes and efforts of students in the experimental class.

It was recommended that studies of this type be continued and that all persons responsible for training be involved in planning and conducting such studies. Inclusion of more than one class was recommended. Order No. 73-23,764, 80 pages.

34: 1670-A Oct '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Killam (Last name), Jacqueline (First name), Rae (Middle name)

Exact Title Occupational Information Relevant to the Plastics Industry Recommended for Secondary Curricula

Degree granted Ed. D., Date 1972, No. of pages in report 286

Granted by University of California, (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The concept of this investigation originated in the determination that the tremendous growth of the plastics industry had far outdistanced a comparable growth in training workers in secondary school programs for this field. With the prediction of even greater growth in the industry, and a still greater lag in the preparation of workers, the need for a thorough study existed. Therefore, this research was confined to the comparison of the needs of the plastics processing industry with occupational skills and knowledges suitable for secondary school instruction.

The literature was reviewed. First, none of the studies matched the needs of industry and the appropriateness of instruction to meet these needs. Second, there was no compilation of appropriate job descriptions within the industry. Therefore, a list of skills and related occupational information about the plastics processing industry was developed. The instrument of survey, a questionnaire, was then constructed and disseminated among 411 educators and 300 industrialists. Of these, 68 percent were usable questionnaires, some having been returned unanswered.

The correlation of the fifty-six skills and/or knowledges listed in the instrument and regarded by the respondents with respect to their suitability for secondary level instruction and with respect to skilled, semiskilled or professional workers in the industry was determined.

Evaluating the responses of the educators by categories it was found that Knowledges, Finishing, and Fabricating were the most suitable categories for instruction in junior high schools, while Knowledges, Career Opportunities and Finishing were similarily appropriate at the senior high school level. Educators placed great emphasis on awareness of hazards and knowledge of types of plastics as most appropriate for junior high school students, while they ranked knowledge of manufacturing career opportunities as most appropriate for senior high school students.

Industrial respondents consider Finishing, Fabricating, and Basic Processes to be most important for semiskilled workers. Inspection, Knowledges, and Job Description categories were their choice as the most important for skilled workers to know. These same members of the plastics processing industry ranked General, Career Opportunities, and Knowledges highest for professional employees.

There is little correlation between what educators find appropriate for senior high school instruction and what industrialists list as their needs. Some correlation does exist, however, between what educators feel is appropriate for junior high school instruction and what industrialists want in their semiskilled workers.

One result of this research is clear. Educators are less knowledgeable about the plastics processing industry's needs than the industry members would like them to be.

The information developed in this investigation was, indeed, much needed, and indicated that educators and industry have much work to do together. This will consist of setting up programs for students to learn meaningful facets of the plastics processing industry so that they may be qualified to fill the occupations currently available, as well as fill new needs as the industry expands, according to educated predictions.

Order No. 73-6388, 286 pages.

(33: 4907-A) March '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Kinzy (Last name), Donald (First name), Wayne (Middle name)

Exact Title The American Council on Industrial Arts Teacher Education: Its Origin, Development, Leaders, and Accomplishments

Degree granted Ph. D., **Date** 1973, **No. of pages in report** 286

Granted by The Ohio State University (Name of institution) Columbus, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of Study: The purpose of this study was to determine why and how the ACIATE was formed, how it developed, what patterns of leadership existed, and what it has accomplished.

Source of Data and Method of Study: The historical method of research was employed. The major sources of data were the historical records of the ACIATE and other organizations (AIAA, AVA, NAITTE); interviews and personal records of the founders and early members; and information contained in libraries, especially The Industrial Arts Teacher.

Findings and Conclusions: The ACIATE and AIAA both grew from The Ohio State University graduate program. The ACIATE was formed in 1950 with the majority of industrial arts teacher education leaders favoring it although there was opposition from some leaders of the NAITT.

The ACIATE's membership growth has been a straight line pattern of some magnitude. The leadership of the ACIATE has also expanded to include most of the profession.

The yearbook was one of the major objectives and accomplishments of the Council and was made possible by the McKnight & McKnight Publishing Company's agreement to underwrite it. The Council has also produced a monograph series and initiated the Industrial Teacher Education Directory which has been published as a joint venture with the NAITTE.

The ACIATE has honored outstanding members through its Man-of-the-Year award and honorary life memberships. The Council has worked with other organizations, especially in the area of accreditation; ACIATE produced accreditation standards and guidelines in 1957 and 1973. The Council has also done work in the program areas of evaluation, plant and facilities, graduate and undergraduate studies, research, and convention programs.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Koch, James, Lee
(Last name) (First name) (Middle name)

Exact Title Technicians: A Study of Their Needs and the Effects of Need Fulfillment and Status Inconsistency on Organizational Integration

Degree granted Ph. D., Date 1972, No. of pages in report 348

Granted by University of California Los Angeles, California
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

In the advanced technologies of today's organizations technicians play many and varied roles, and they are among the most rapidly growing occupational groups. Despite their increasing importance, however, they have been the focus of surprisingly little research. In comparison to the professionals they assist, relatively little is known about their job and career needs, and models dealing with how to improve their integration into organizations are virtually nonexistent. This study develops and empirically tests a behavioral model for assessing the impact of incongruity on their readiness to actively support a favorable organizational climate.

The central hypothesis is that the degree of balance or congruity between the individual technician and his position will shape his degree of integration into the organization. Two measures of congruity are considered: the balance between technician needs and perceived opportunities for need fulfillment; and, status congruity. The measures of organizational integration examined are: overall job satisfaction, alienation; identification with the organization, technician-professional relations, occupational commitment; and propensities to quit.

The scales measuring various need areas were constructed through an application of factor analysis to 13 separate statements concerning various job and career needs. The factors to emerge from this analysis were: structure and feedback; social and prestige factors; job control, and, personal growth. A measure of incongruity on each of these need indices was constructed by subtracting the degree of satisfaction on each scale item from the degree of importance associated with each of the respective items. Similarly, status incongruity was measured by considering differences which exist on self-rated measures of status: knowledge; skill; responsibility; prestige; authority; and, opportunity for advancement.

The research site for this study was the United States Forest Service, the largest land management organization in the world. A survey questionnaire was administered to approximately 500 technicians in a national sample. The form used was similar to an instrument administered to professionals in the Forest Service, and this permitted a cross-occupational comparison of needs and need fulfillment.

The results from this study confirmed the primary hypothesis. Regardless of the need area considered, the lower the need fulfillment the lower the score on all measures of integration into the organization. Thus, those experiencing higher degrees of incongruity between their needs and perceived opportunities tended to be more alienated: less satisfied with their jobs; less committed to their occupation; and, less strongly identified with the organization. They also had more negative attitudes toward professionals in the Forest Service, and they were more likely to quit the organization in the forseeable future.

Perceived status inconsistency had a similar relationship to measures of organizational integration. In addition, it was positively associated with interest in unionization and interest in certification. Both of these factors were considered in this study as possible means of alleviating status inconsistency. Through such associations, it appears that the technician seeks to bring his status dimensions into a balanced or consistent relationship with each other. In this manner the analysis suggests he attempts to create a feeling of distributive justice.

On the basis of the empirical evidence presented in this study it is concluded that the technician is not unlike professionals in his desire to fulfill many of his important needs at work. Job control and personal growth, for example, are no less important to him than they are to the professional. His perceived opportunity to fulfil these and other needs, and his perceived status congruity are significantly associated with how he feels about the Forest Service and his role within this organization.

Order No. 72-25,795, 348 pages

33: 1836-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Korb, August, Wilfred
(Last name) (First name) (Middle name)

Exact Title A Study of Selected Practices in the Use of Advisory Committees, Community Surveys, and Placement Services in Trade and Industrial Education Programs in Ohio

Degree granted Ph. D., Date 1972, No. of pages in report 146

Granted by The Ohio State University Colombus, Ohio
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to investigate the relationship between the manner and extent school districts use (1) vocational advisory committees, (2) community surveys, and (3) school placement services, and selected outcomes and inputs of trade and industrial education programs in Ohio.

Selected outcomes and inputs included: number of graduates placed in employment, occupational achievement test scores attained by seniors, degree of success graduates experience in meeting licensure requirements, percentage of teacher turnover, number of students desiring a trade and industrial education program, and the number of trade and industrial education program offerings in each school.

Nine hypotheses were postulated, and a survey instrument developed and mailed to one hundred and sixty-five teachers with a return of seventy-eight per cent.

The population, which consisted of all trade and industrial education programs in public secondary schools in Ohio having three or more trade and industrial education offerings, was stratified into five strata representing different sizes and purposes. A sample of thirty-three and one-third was selected from each stratum. The statistical treatment involved the Pearson product moment correlation and the point-biserial correlation.

The relative recency of community surveys was found to be significantly related to the following: degree of activeness of advisory committees, use of advisory committees for developing course materials and interpreting needs of industry and business, frequency of advisory committee meetings, and relative size of the budget allotted for consumable supplies in each program. Both the longevity of the individual trade and industrial education program in a school and the teacher's tenure in the occupational program were negatively related to the relative recency of the community survey.

Although not statistically significant a positive correlation was found to exist between the relative recency of the community survey and the number of graduates employed.

The degree of activeness of the occupational advisory committee correlated significantly with both the size of the budget apportioned for consumable supplies in each program and the number of graduates placed in employment by the advisory committee. Relatively small relationships were found between the activeness of advisory committees and student success in meeting licensing requirements, attaining high scores on achievement tests, and in finding employment upon graduation.

Sixty per cent of the programs had in-school placement services available to the students. Placement responsibilities were provided most often by the occupational teachers followed closely by the guidance counselors.

Major conclusions and recommendations included:

1. The relative activeness of an occupational advisory committee reflected the size of the budget apportioned for consumable supplies and the recency of community surveys.
2. The relative recency of community surveys reflected the size of the budget apportioned for consumable supplies and the success of graduates in obtaining employment.
3. Well-defined, in-school, placement services were not in general use.
4. A similar study should be conducted to include all vocational education programs with a multi-state population.
5. Further research should be conducted to ascertain both optimum frequency of community surveys, and methods for establishing budgets and how they relate to various factors in the community.

Order No. 72-27,043, 146 pages.

33: 1605-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Kovach, Robert, Vincent
(Last name) (First name) (Middle name)

Exact Title A Study of Michigan Community College Administrator Attitudes Regarding the Desired Formal Qualifications of Community College Faculty Members

Degree granted Ph. D., Date 1972, No. of pages in report 209

Granted by Michigan State University East Lansing, Michigan
(Name of institution) (City, State)

Where Available: Microfilm ( ) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to determine the present attitudes of chief community college administrators concerning the desired formal qualifications of community college faculty members. In order to do so, specific research questions were posed and relevant data were sought. The major questions explored in the study were as follows: 1. What formal qualifications are considered by community college administrators in their recruiting and selection of faculty members? 2. What do community college administrators consider to be the minimum formal qualifications, in terms of educational training and background experiences, that a prospective teacher must possess in order to be considered for a teaching position? 3. What do community college administrators believe to be the most desirable formal qualifications with respect to educational training and experience? 4. Are community college administrators having difficulty finding faculty members with the formal qualifications they desire?

On the basis of the data gathered for this study, the following major conclusions seem appropriate:

1. Formal qualifications relating to educational training at both the graduate and undergraduate levels were rated as the most important qualifications to consider in prospective faculty members. The only types of experience given important consideration as qualifications were previous community college teaching experience and nonteaching experience.

2. Very little consideration was given to the personal characteristics of age, sex, and race of a prospective teacher unless administrators were trying to employ individuals to made their staffs more representative with respect to these characteristics.

3. The practice of "balancing" a faculty is accepted by a large majority of community college administrators. Respondents indicated that the formal qualifications of age, sex, and race plus the distribution of master's, doctorates, and other degrees should be considered in attaining and maintaining some "balance" of faculty.

4. Community colleges are having very little difficulty in recruiting qualified faculty members at the present time; and will probably experience the same or even less difficulty in this task in the near future. The only exception appears to be in the applied arts area, where institutions are having some difficulty in recruiting certain types of instructors.

5. The master's degree plus at least one professional course in community college education should be the minimum educational training required of prospective liberal arts teachers. The bachelor's degree plus one professional course in community college education was established as the minimum educational training for applied arts teachers; however, many administrators desired the master's degree as the minimum academic degree for applied arts instructors.

6. No real minimum criteria concerning types of experience were established for prospective community college teachers, with the exception of three years of vocational industrial experience required for applied arts teachers.

7. Educational training was considered more important than teaching experience as a qualification for a liberal arts teacher. Vocational industrial experience was considered to be the most important qualification for an applied arts teacher. These qualifications were considered to be easily found among present community college faculty. Community college teaching experience, viewed by many administrators as the most important type of teaching experience for a community college teacher, was the qualification most difficult to find among present community college faculty.

8. Formal preparation programs for community college instructors should be different from programs for high school or senior college teachers. Many respondents indicated that they are not satisfied with present preparation programs for community college instructors. They also indicated that colleges of education are not the most appropriate organizations to offer preparation programs for community college teachers.

9. The most desirable degree for a community college instructor is the master's degree in the subject field in which he is teaching. Administrators indicated that advanced work beyond the master's degree was desirable as long as it contributed to the faculty member's role as a teacher. Almost half the respondents thought community colleges should encourage faculty to take advanced coursework by paying the tuition of those who wish to undertake such work.

10. Community college instructors should not possess doctoral degrees of either the "teaching" or the subject field types. Many administrators indicated that they do not believe that most Ph.D.'s can be excellent and committed community college teachers. They also did not strongly support the statement that the Doctor of Arts degree is more appropriate than other doctorates for community college teachers.

11. Formal qualifications criteria should be different for community college liberal arts and applied arts teachers. However, respondents indicated that formal qualifications criteria should be the same for full-time and part-time faculty members in these areas.

12. The attitudes of administrators concerning the desired formal qualifications of faculty members at the community college level were generally very consistent across types of administrative positions and types of institutions.

Order No. 73-5419, 209 pages.

(33: 5005-A) March '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Kroh (Last name), Damon (First name), K. (Middle name)

Exact Title Relationship of Industrial Arts to the Modern Elementary School Curriculum: Recommendations for Improvements in Elementary Industrial Arts Undergraduate Teacher Education Programs in New York State Colleges.

Degree granted Ph.D, Date 1957 No. of pages in report 344

Granted by New York University (Name of institution) New York, New York (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To prepare a set of recommendations for consideration by industrial arts department in teacher-education institutions in New York State, with a view to the more adequate preparation of elementary school industrial arts teachers.

Source of data and method of study: Administrators were questioned concerning their school special services, including the industrial arts program and shop teachers were questioned about their undergraduate training and its suitability as preparation for their present positions. Respondents were asked to propose recommendations which could be used in consideration of possible revisions of undergraduate curricula.

Findings and Conclusions:

Briefly, the findings were that:

1. The majority of elementary industrial arts teachers serve in a consultant capacity.
2. Teachers believe that they were inadequately prepared for their present positions, and that to overcome the lacks they must pursue graduate work.
3. Both teachers and administrators recommend that college curricula be revised to provide understandings concerning elementary school organization, methods and curriculum, and courses in child study and child psychology.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Ku (Last name), George (First name), C. (Middle name)

Exact Title An Analytical Study of the 1971-1972 Cooperative Vocational Program in Utah with Comparison to a Guideline for Cooperative Vocational Programs.

Degree granted Ed. D., Date 1972, No. of pages in report 121

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was (1) to develop a guideline for cooperative education; (2) to determine the current status of cooperative vocational education in Utah; and (3) to compare current practices with the established guideline.

This study was completed in two parts. The first part involved the construction and verification of a guideline for cooperative education in Utah; the second, a survey of the current status of cooperative education. A descriptive survey technique was employed to gather data required for determination of the guideline's validity and relevance, and the current status of cooperative education in Utah.

All 13 key administrators in the state office, 75 coordinators representing 84 percent of the initial mailings and 112 cooperating employers or 74 percent of the selected sample participated in this study.

Opinions from the 13 key administrators in the Utah State Division of Vocational and Technical Education were largely in agreement with the tentative guideline derived from the two nationally accepted guides in cooperative education.

Due to the lack of an official guide for cooperative education in Utah, many of the coordinators' interpretations of federal legislation and state regulations were based on their own convenience. Inconsistencies in programs, standards and requirements were frequently found among cooperative programs in Utah.

There appear to be some discrepancies existing between the current practices and the established guideline mainly because in a majority of the programs: (1) students spend insufficient numbers of hours in attending school or receiving on-the-job training; (2) schools provide inadequate in-school instruction; and (3) students receive substandard on-the-job supervision.

Order No. 73-5604, 121 pages.

(33: 4907-A) March '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Kuehl (Last name), Henry (First name), William (Middle name)

Exact Title A Study of the Factors Which Influenced Michigan Industrial Arts Teachers' Selection of Instructional Units

Degree granted Ed. D., Date 1972, No. of pages in report 115

Granted by Michigan State University (Name of institution) East Lansing, Michigan (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

The problem investigated in this study was to determine what factors are related to Michigan industrial arts teachers' selection of instructional units.

It was hypothesized that those methods of exposure which demonstrated the units in situations most nearly like the teachers' own teaching situations would be most frequently associated with the teachers' use of the units. It was therefore hypothesized that the methods of exposure ranked from most to least associated with teachers' use of the units would follow the order: observation of fellow teachers teaching the units; observation of student teaching supervisors teaching the units; participation in the units while enrolled in college classes; observation of teachers in other schools teaching the units; observation of video tape, movie, or slide presentations of secondary or college students performing the units; hearing the units described at meetings; discussing the units in college classes; and reading about the units.

Methodology

Six industrial arts units and ten methods of exposure to new instructional practices were identified from the literature and common usage in the field. An Industrial Arts Unit Inventory was developed to ascertain whether Michigan secondary industrial arts teachers had been exposed to the six units in any of the ten identified ways. The inventory also requested respondents to indicate reasons why they had taught or had not taught the units.

The inventory was mailed to a random sample of 500 secondary industrial arts teachers in the state of Michigan. Returns were received from 301 members of the sample.

The Spearman rank-difference correlation and the analysis of variance were utilized to test the hypothesized difference in methods of exposure between those teachers who had taught units and those who had not.

Findings and Conclusions

A correlation of .90 was found between the predicted rank of the methods of exposure and the rank of methods of exposure across all units, which was based on the proportions of teachers who reported they used the units. However, correlations computed between predicted and observed ranks of individual units revealed that only one out of six units was significantly correlated with the predicted rank.

An exposure score was computed for each teacher by assigning him a certain number of points for each exposure. An analysis of variance was computed to determine whether there was a significant difference between the means of the exposure scores for teachers who taught units and those who did not. The variance was significant beyond the .001 level of confidence.

More teachers appeared to value product design and project units than the other units. Teachers frequently reported lack of funds and inappropriateness of the units as reasons for not using the units. Rejection of units to satisfy the wishes of building principals was not reported very often as a reason for not teaching the units.

Major conclusions were:

1. The number of teachers who indicated they use instructional units increases as the methods by which they have been exposed to the units follow the order: read about; discussed in college class; meeting; junior and or senior high school experience; movie, video tape, or slides; other schools; college laboratory; student teaching; and fellow teacher.
2. Teachers frequently indicated they do not select instructional units because they are inappropriate for the technical areas they teach, their students are not capable of carrying out the units, they have insufficient operating budgets, and they lack the knowledge to carry out instructional tasks. The teachers did not indicate a high frequency of rejection of instructional units because of their principals' requests.

Implications and Recommendations

It appears that demonstration of units in settings which are very similar to those of the observing teachers should be utilized as a pre-service and in-service model.

Demonstration of units could be accomplished by: (1) having teachers perform them in college classes, (2) demonstrating them in summer workshops which utilize the teachers' peers as demonstrating teachers, (3) showing teachers video tapes or movies of their peers teaching the units in the normal course of their teaching, and (4) selecting student teaching supervisors who teach the units.

It is recommended that a study be conducted to test experimentally the conclusions of the study.

Order No. 73-5420, 115 pages.

(33: 4908-A) March '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author LaBorde (Last name), Gerald (First name), Keith (Middle name)

Exact Title A Study of the Relationship Between Attitudes Toward Vocational Education and Knowledge of Vocational Education of Tennessee Guidance Personnel

Degree granted Ed. D., Date 1973, No. of pages in report 161

Granted by University of Tennessee (Name of institution) Knoxville, Tennessee (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Objectives

The objectives of the study were to determine the relationship between Tennessee school guidance counselors' attitude toward vocational education and their knowledge of vocational education; and to ascertain the relationship between attitude toward vocational education or knowledge of vocational education and variables in the counselor's background.

To accomplish these objectives twenty-one hypotheses were set for the study.

Procedure

A Personal Data Form, "Attitude Toward Vocational Education," and "A Purview of Vocational Education" were mailed to 220 Tennessee school guidance counselors. Of this group, 110 counselors had participated in a summer vocational guidance workshop sponsored by the Tennessee State Department of Education. The remaining 110 counselors had not participated in a summer guidance workshop. Complted usable materials were returned by 71% of the counselors. The data for the hypotheses testing were subjected to a Pearson Product-Moment Correlation and analyses of variances at the .05 level of significance.

Findings

The major findings of the study were:

1. A positive significant relationship was found between counselors' attitude toward vocational education and their knowledge of vocational education.
2. Full-time counselors appeared to have a more positive attitude toward vocational education than the part-time counselors.
3. Counselors that had been students in high school vocational education programs did not have a more positive attitude toward vocational education or greater knowledge of vocational education than the counselors that had not been students in vocational programs.
4. Counselors that had taught courses in vocational education did not have a more positive attitude toward vocational education or greater knowledge of vocational education than the counselors that had not taught courses in vocational programs.
5. Noneducational work experience, either summer or full year, did not appear to influence the counselors' attitude toward vocational education.
6. The variables of counselors' age, sex, marital status, teaching preparation, or counselor certification did not appear to be related to the counselors' attitude toward vocational education or their knowledge of vocational education.
7. Counselors who were participants in the summer vocational guidance workshops had a significantly more positive attitude toward vocational education and a greater knowledge of vocational education than the counselors who had not participated in the summer workshops.

Recommendations

The following recommendations were offered:

1. That experiences should be offered to counselors in training to provide for interaction with administrators and supervisors of all educational programs.
2. That a variety of practicum experiences in other than educational institutions be provided to counselors in training.
3. That practicum experiences and opportunities be provided for counselors throughout the state using extension centers and other central areas.
4. That other studies be conducted to assist counselor educators in their recruiting and training efforts.

Order No. 73-20,017, 161 pages.

34: 1083-A Sept '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Landers, Mack, M.
(Last name) (First name) (Middle name)

Exact Title The Comparative Effects of Two Laboratory Approaches on Informational Achievement, Informational Retention and Attitudes in Wood Technology at the College Level

Degree granted Ed. D., Date 1972, No. of pages in report 167

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose: The purposes of this study were to compare experimentally the relative effectiveness of the project approach to laboratory activity and the exercise/experiment approach to laboratory activity on the variables of (1) informational achievement, (2) informational retention in wood technology, and (3) attitudes of college students toward wood technology.

Method of Research: The experiment was conducted using the project approach treatment and an exercise/experiment approach treatment, with twenty subjects in each group. Each group was a section of the course identified as Wood Technology, MF&C 12-10, offered through the Division of Industrial Arts and Technology, Central Missouri State College, Warrensburg, Missouri. The "Non-Equivalent Group" design was employed in order that regular registration procedure could be accepted as the method of assigning subjects to randomly assigned treatment groups.

Scores obtained by the Cooperative School and College Ability Test were utilized to ascertain the initial status of the groups on the variable of college aptitude. To ascertain the students' prior knowledge of wood technology, an eighty item evaluation instrument was constructed to test the students' ability to reason on three cognitive levels (knowledge, application and synthesis). Of the above tests, neither indicated a significant difference; therefore, it was assumed that the subjects were from the same population. To ascertain the attitudes held by the subjects toward wood technology, the Remmers Scale for Measuring Attitude Toward any School Subject: Form A as the pretest and Form B as the posttest were utilized. An analysis of the scale scores did not reveal any significant difference between the treatment groups.

Each treatment group had the same classroom instructor who also served as laboratory supervisor for both groups. The two groups received the same number of laboratory assignments; however, the type of laboratory assignment was the experimental variable. Posttests of informational achievement and attitude were administered at the conclusion of the experiment. A test of informational retention was administered three weeks after completion of the experiment.

All items used in the pretest, posttest and test of retention were evaluated for validity by a panel of specialists. For purposes of estimating reliability the instrument was administered prior to the experiment to a group with characteristics similar to those of the experimental groups. The resulting scores were analyzed, utilizing the Kuder-Richardson Formula 20, which revealed a reliability value of .973.

Conclusion: When the groups' mean scores on the posttest of achievement and test of retention were compared no significant differences were revealed, thus indicating that the type of laboratory activity (project or exercise/experiment) did not have a significantly different influence upon the informational achievement or retention of information by the students.

Upon comparison of the groups' mean score on the posttest of attitude, no significant difference was revealed thus indicating that the type of laboratory activity did not have a significantly different influence upon the attitude of the students.

Recommendations: The exercise/experiment approach to laboratory activity gives the industrial arts educator another approach to laboratory activity which is not significantly different in its effects upon learning and attitude toward the course than the project approach to laboratory activity.

Therefore, it is recommended that the industrial arts educator select and devise a balanced sequence of both types of laboratory activities in a comprehensive instructional program in the woods area of industrial arts. Order No. 73-21,448, 167 pages.

34: 1113-A Sept '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Langford, Harry, E., Jr.
(Last name) (First name) (Middle name)

Exact Title Interaction Patterns of Instructors in a College of Education and Their Relation to the Students' Perception of Instructors.

Degree granted Ed. D., Date 1973 No. of pages in report 93

Granted by University of Northern Colorado Greeley, Colorado
(Name of institution) (City, State)

Where Available: Microfilm ( ) Microfish ( ) E.R.I.C. ( )

Purpose of Study: To determine if a relationship exists between the verbal interaction of higher education instructors and their teaching effectiveness as rated by the students.

Source of data and method of study: Based on student ratings, a sample of five more effective instructors and five less effective instructors were selected for observation. During observation, verbal interaction of the instructors was categorized into a modified Flanders' Interaction Analysis System. The two samples were compared using a statistical analysis of the amount of time spent in the various categories of the modified Flanders' system.

Findings and Conclusions: The findings resulting from this study were as follows:

1. The instructors rated more effective by their students accept and use significantly more of the students ideas than the instructors rated as less effective by their students.
2. In the classes of the instructors who were rated as more effective by their students, significantly more of the classroom time was spent in student initiated talk.
3. Reactions to student feelings and non-verbal communication were found to be nearly non existent in this sample.
4. Asking questions occurred more frequently in the classes of the more effective instructors than in the classes of the less effective instructors.
5. Continuous lecturing occurred more frequently in the classes of the less effective instructors than in the classes of the more effective instructors.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Lawson (Last name), om (First name), Edgar (Middle name)

Exact Title The Effects of Specificity and Placement of Instructional Objectives on Attitude and Intentional and Incidental Learning

Degree granted Ph. D., Date 1973, No. of pages in report 141

Granted by University of Illinois at Urbana (Name of institution) Champaign, Illinois (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purposes of this investigation were: (1) to determine which of the two types of specificity of objectives (general in comparison with specific) promoted the greatest cognitive achievement, intentional and incidental; (2) to ascertain the effect of placement of objectives on cognitive achievement (intentional and incidental) within the two specificity treatments; (3) to determine the influence of the above stated variables on both intentional and incidental retention as measured by the delayed achievement test; and (4) to determine the effects of specificity and placement of objectives as measured by the Students' Perceptions of Instructional Objectives scale.

The instructional materials consisted of five written passages dealing with engineering graphics content. The materials were presented to introductory general engineering students from the University of Illinois at Urbana-Champaign. Eighty-four of these Ss, on which total data were available, were utilized in all reported analyses.

Two experimental variables were arranged in a 2x2 multivariate factorial scheme. The experimental design resulted from the factorial combination of: (1) the specificity of the instructional objectives, i.e., the general or specific orienting directions; and (2) the placement of objectives within the written passages. Objectives appeared either totally at the beginning of each passage or were systematically interspersed throughout, appearing prior to identified section topics. The dependent measures consisted of intentional and incidental test items.

The main effects analysis on immediate achievement disclosed that all objective treatments combined were superior to the Conventional Learning Directions (CLD) group. However, neither level of specificity of the objectives nor their respective placement yielded significant differences among themselves. On retention, the groups which received specific objectives were superior to those utilizing general objectives. Moreover, all experimental treatments combined yielded superior results on retention as compared with the CLD group.

Further analysis on immediate achievement indicated that there were no significant differences produced by the placement variations under which objectives were presented to Ss. This finding also applied to delayed achievement.

Additional analysis disclosed that on immediate achievement, neither intentional nor incidental learning was influenced by either the specificity of instructional objectives or their placement. As measured by delayed achievement, the specific objectives produced higher intentional performance but at the same time did not critically weaken incidental recall. The treatment variations did not produce any significant variation on attitude as perceived by the Ss.

In general, the findings of this investigation suggest that instructional objectives promote acquisition on both intentional and incidental performance, whereas specifically stated objectives enhance retention on intentional learning.

Order No. 73-17,584, 141 pages.

34: 679-A Aug '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Leavitt (Last name), Max (First name), V. (Middle name)

Exact Title A Follow-Up Study of T-VI Graduates as Viewed by Their Employers

Degree granted Ed. D, Date 1972, No. of pages in report 285

Granted by The University of New Mexico (Name of institution) Albuquerque, New Mexico (City, State)

Where Available: Microfilm ( ) Microfish ( ) E.R.I.C. ( )

Statement of the Problem: The study was accomplished to determine if the Albuquerque Technical-Vocational Institute was meeting the needs of businessmen and industrialists of Albuquerque and New Mexico, to provide feedback to T-VI from the employers of T-VI graduates in the form of recommendations for improvement, and to validate T-VI applicant screening and grading procedures by comparing them with employer ratings (on eleven worker traits) and wages paid to graduates.

Procedure: Biographical information, General Aptitude Test Battery scores and T-VI grade point averages for graduates surveyed were gleaned from T-VI and New Mexico Employment Security Commission files. Known employers of graduates were listed and a two-page survey form was sent to each. Data from responses to the survey were analyzed for each of the ten T-VI training programs and several combinations of programs to provide descriptive statistical information, a correlation matrix comparing each GATB score, grade point average, beginning and ending wages and employer ratings with every other variable and an analysis of variance based on differences in sex, marital status, age and formal education.

Results: Of 570 survey letters mailed, 87.1% were returned, but only 65.4% were complete enough for computer analysis. Analysis of the returns showed that over 90% of the T-VI graduates found work in New Mexico. Seventy-eight percent of Trade graduates and 93% of Technology graduates worked in a job closely related to their T-VI training. Employers selected dependability, willingness to learn, job knowledge, quality of workmanship and interest in the job as the five most important worker traits among over fifty listed. Employers recommended greater training relevance to "real business life," the ability to apply knowledge, instilling in graduates a pride in one's work, continued self-improvement, loyalty to the company and personal initiative as the key needs for improvement in T-VI training. Generally, employers had high praise for the quality of training at T-VI.

The United States Department of Labor provided the GATB sub-tests to be used and cut-off score guidelines to screen applicants for T-VI programs. These were acceptable for T-VI's needs in several programs, but require modification in others. As a general rule, the GATB Intelligence, Verbal, Numerical and Clerical Perception scores predict graduates' success best. Other sub-test scores are useful for individual training programs.

T-VI grades were divided into four categories: Mathematics, English, Major Subjects and a Composite of all GPA's. The Major Subjects grades had the best predictive value for employers' ratings and wages. The other grades had more limited usefulness. Employers' ratings did not correlate with wages as closely as might be expected. Many employers verbally stated they wanted dependability, job knowledge, pride, loyalty, etc., but they tended to pay higher wages to the graduates who displayed leadership and accuracy. Despite equivalent T-VI training, employers paid males higher than females, married graduates more than single graduates, the divorced or widowed, and older graduates more than younger ones. Pre-T-VI formal education had little direct effect on either employers' ratings or wages paid.

Conclusions: T-VI needs a better system of matching interest and aptitudes during its screening of applicants. Greater emphasis should be placed on relevancy to the world of work, on development of judgement and decision making, on dependability, on willingness to continue learning and on initiative. Despite these weaknesses, the training programs offered do meet the major needs of graduates' employers. The United States Department of Labor use of the General Aptitude Test Battery does not appear to be valid for some training programs and many applicants at T-VI. Locally designed cut offs and combinations of sub-tests is necessary for more accurate applicant screening. With some modifications in the combination of sub-tests, the GATB could do a much better job of screening applicants for all T-VI programs (except Office Education). The GATB should not be used in screening Office Education applicants. Other specific recommendations are outlined in the original research paper.

Order No. 72-30,732, 285 pages.

33: 2252-A Nov '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Lee, Moon, Yong
(Last name) (First name) (Middle name)

Exact Title A Comparative Study of Apprenticeship Schemes in Selected Developing Countries

Degree granted Ph. D., Date 1972, No. of pages in report 182

Granted by Michigan State University East Lansing, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study was undertaken to identify implications and possible generalizations arising from the comparison of apprenticeship schemes in India, Japan, Kenya and Nigeria. Some implications of the findings for Korea are considered in the conclusion.

The major aspects of an apprenticeship scheme examined by this study are: linkage between the apprenticeship system and the educational and training system, location of different types of apprenticeship programs, employment status of apprentices, educational attainment of apprentices, apprenticeable trades, organization of instruction, trade tests, recruitment and training instructors, and sponsors. The data for this study were gathered from research reports and government documents.

The major findings of this study were:

1. Vocational and technical education is regarded as prevocational preparation for an apprenticeship. Vocational training in institutes also tends to be regarded as the prevocational.

2. Large industrial establishments run independent apprenticeship programs. National apprenticeship schemes either organize or assist the apprenticeship programs in small and medium industries. The enrollment in both sectors is small. A vast number of apprentices are trained in indigenous apprenticeship programs.

3. If an employer is obligated to take more apprentices into his establishment than he needs, he is likely not to provide the apprentices with gainful employment during and after the training. If an employer is not obligated to pay apprentices with wages and to employ them upon the completion of the apprenticeship, he is likely to take a larger number of apprentices in than he actually needs; apprentices become cheap laborers.

4. Actual educational attainment of apprentices is becoming higher than that which is required either by legal provision or by industry. This phenomenon exists in both more and less developed countries.

5. Developing countries are in the process of broadening public apprenticeship schemes by adding new trades to the list of unauthorized apprenticeable trades. Also, apprenticeship is broadening its scope to include emerging trades and service trades.

6. As apprenticeship becomes formalized it emphasizes classroom instruction and basic training, both functions of formal schools. The training institutes of the ministries of labor have recently added these functions.

7. More developed countries use trade tests to promote national standards for skills. Less developed countries use them as a ritual for job control.

8. Instructors are recruited within industrial establishments. Prolonged training of instructors in training institutes is not welcomed by industries.

9. Major financial and other assistance by governments are provided to apprenticeship programs in small and medium industries.

In view of both the limited absorptive capacity of school leavers by modern industries and the limited resources for education and training in Korea, this study suggests the promotion of indigenous apprenticeship programs. The major recommendations for the new policy are:

1. The policy should be the one that establishes industrial extension services for indigenous industries. No additional training institutes or no expansion of present training institutes should be attempted.

2. Assistance to apprenticeship programs in modern industries should be minimized.

3. Employment of apprentices should not be controlled by government. Government's supervision should be limited to preventing abuse of youths by employers.

4. Vocational education and training in schools and institutes should be confined to pre-vocational education and training and no attempt to simulate the industrial process in schools and institutes should be undertaken. The schools and institutes should provide classroom instruction for indigenous apprenticeship programs.

5. Curriculum standards for apprenticeship programs should be adapted to changing educational attainment of apprentices.

6. No attempts should be made to enforce a licensing system for instructors of apprentice training.

7. Governments' efforts should promote directly the indigenous industries and encourage the completors of apprenticeship training to create their own business.

8. No rigid legal standards for training and tests should be enforced; the tests should be in the form of national skill competition. Order No. 73-12,762, 182 pages.

33; 6153-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Lee (Last name), Raphel (First name), D. C. (Middle name)

Exact Title Relationship of Selected Demographic Characteristics and the Job Satisfaction of Industrial Arts Teachers

Degree granted Ed. D., Date 1972, No. of pages in report 149

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The present study analyzed nine types of relationships; viz., (1) between selected demographic variables and level of job satisfaction, (2) between selected demographic variables and the level of job satisfaction related to job content factors, (3) between selected demographic variables and the level of job satisfaction related to job context factors, (4) between selected demographic variables and the degree of importance assigned to job content factors, (5) between selected demographic variables and the degree of importance assigned to job context factors, (6) between job satisfaction and job content factor satisfaction, (7) between job satisfaction and job context factor satisfaction, (8) between "importance" and "satisfaction" ratings of job content factors, and (9) between "importance" and "satisfaction" ratings of job context factors. The primary purposes of the study were to ascertain: (1) the possible influence of selected demographic variables on job satisfaction and importance variables, (2) the relationships between job satisfaction and job content and context factor satisfaction, and (3) "satisfaction" and "importance" ratings of job content and context factors.

Job attitude factors were selected and classified based upon Herzberg's theory which employed a content-context dichotomy classification.

The population for the study was composed of industrial arts teachers who were teaching in the secondary schools in Missouri during 1971-1972.

The sample selected for this study was 50 per cent, or 531, of the total, 1062, industrial arts teachers who were teaching in the secondary schools in Missouri during 1971-1972. A Missouri Industrial Arts Teachers Directory, 1971-1972 was used for identifying and selecting the subjects.

The data were collected through mailed survey instruments. A total of 366, or approximately 70 per cent, of the teachers completed and returned questionnaires and information forms which provided basic data for the analyses made in this investigation.

The instrument used for securing data describing the independent variables was a Demographic Information Form. A modified Job Attitude Questionnaire was used for gauging the job satisfaction (dependent) variables. A pilot study was conducted for estimating the reliability of the instrument employed. The instruments were scored and the resulting data was punched on IBM cards.

Five multiple regression equations were developed for the purpose of ascertaining the influence of selected demographic variables on job satisfaction measures. Findings revealed that these selected demographic variables, as a whole, when entered into the multiple regression equations, contributed only 2 to 6 per cent of the variance on the dependent measures in predicting the dependent measures (job satisfaction, job factor satisfaction, and job factor importance ratings). However, significant differences ($p \leq .05$) were revealed with respect to job satisfaction measures and "importance" ratings only.

Further examination of the findings revealed that there were statistically significant relationships ($p \leq .05$) between overall job satisfaction and job content and context factor satisfaction measures. Furthermore, findings revealed that there were significant relationships, ($p \leq .05$), between "importance" and "satisfaction" ratings of job content and context factors. Thus, taken as a whole, the Herzberg theory was partially supported by the positive correlation exhibited between overall job satisfaction and job content factor satisfaction. However, it was not supported by the relationships revealed between job satisfaction and job context factor satisfaction. However, contrary to Friedlander and Froelich's findings, "importance" and "satisfaction" ratings were representative of one single, unified attitudinal dimension.

Additional findings revealed that only 9 per cent of the teachers were generally dissatisfied with their profession of industrial arts teaching. As far as the job satisfiers are concerned, all the thirteen job attitude factors studied were serving as job "satisfiers."

The implications of the findings and problems for further study were presented. Order No. 73-21,451, 149 pages.

34: 1306-B Sept '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Levande, James, Stanley
(Last name) (First name) (Middle name)

Exact Title An Application of Piaget's Theory of Space and Geometry to Learning Orthographic Projection Concepts

Degree granted Ph. D., Date 1972, No. of pages in report 155

Granted by Michigan State University East Lansing, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to apply Piaget's theory to the learning of orthographic projection concepts in a middle school industrial arts program. A series of games was used to present the concepts in a systematic and sequential manner. The investigation focused on examining the facilitation of learning and the stimulation of the sensory-motor and infralogical systems.

The hypotheses tested concerned: (1) the effects of treatment, classroom unit, and sex upon the stimulation of the sensory-motor and infralogical systems, (2) the effects of treatment, classroom unit, and sex upon the facilitation of learning, and (3) the correlation relationship between reading performance and performance on measures of space relations and orthographic visualization.

The industrial arts program of the East Lansing, Michigan, middle schools was the setting for the investigation. The sample was drawn from the beginning industrial arts classes in the two schools and consisted of 163 students, 95 boys and 68 girls.

The design involved an experimental and a control treatment of four classrooms each. Assignment to treatment was done randomly in each school and provided two experimental and two control groups per school. The experimental group received the presentation of the concepts through the playing of the games. The control group did not receive the presentation of the concepts in the form of the games or in any other manner. Within the experimental group four testing schedules were built around the presentation of three concept groups: (1) points-lines, (2) lines-planes, and (3) planes-forms.

Implementation of the treatments and data collection procedures were completed over an eleven week period during Fall, 1971. The tests used to provide the dependent variable were the Space Relations test and the Visualization Test. The Gates-MacGinitie Reading Tests, Survey - E was used to provide the data in the reading performance area.

Data analysis consisted of univariate and multivariate analysis of variance of gain scores on the pre-test and post-test instruments and an analysis of the correlations between gain scores and reading test scores.

The results of the analysis yielded the following major conclusions: 1. The factor of treatment had no effect on the stimulation of the sensory-motor and infralogical systems with respect to the perception and cognition of the orthographic projection of objects. 2. The factor of group had no effect on the stimulation of the sensory-motor and infralogical systems with respect to the perception and cognition of the orthographic projection of objects. 3. The factor of sex had no effect on the stimulation of the sensory-motor and infralogical systems with respect to the perception and cognition of the orthographic projection of objects. 4. The factor of group had no effect on facilitation through the systematic and sequential programming of the concepts as based on the hierarchy of task complexity in the puzzles and games. 5. The factor of sex had no effect on the facilitation through the systematic and sequential programming of the concepts as based on the hierarchy of task complexity in the puzzles and games. 6. Reading performance is significantly correlated to performance on the measures of space relations and orthographic visualization.

Order No. 72-30,000, 155 pages.

33: 3344-A Jan '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Lewchuk (Last name), Leslie (First name), Lawrence (Middle name)

Exact Title The Relative Effectiveness of Two Ways of Ordering and Presenting Instructional Objectives.

Degree granted ______, Date 1972 No. of pages in report 178

Granted by Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm (X) Microfish (X) E.R.I.C. (X)

Purpose of Study: To identify effective procedures and criteria for sequencing instruction and to use these procedures and criteria to devise alternative learning sequences for a given unit of content in order to determine the effects of sequencing upon student learning.

Source of data and method of study: Two instructional units were prepared using the same subject matter but each followed a different sequential arrangement. The experimental treatments consisted of the presentation of two forms of the instructional units designed for this study and were administered to classes of graduate students subject to pre and postests. The order of presentation of the contents for instruction was different for each treatment. Treatment A was a general to specific sequenced instructional unit, and Treatment B was the reverse.

Findings and Conclusions: The experimental treatments were found to be effective in promoting initial learning of the instructional content. There was no significant difference in achievement between the two experimental groups as measured by their scores on a postest administered immediately after the instructional treatments. Individual response patterns revealed that individual differences were a very real phenomena within the instructional process.

The conclusions were that the specific to general and general to specific sequencing strategies were equally effective within the context of this study. Both sequences produced significant increases in achievement scores.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Light, John, J.
(Last name) (First name) (Middle name)

Exact Title The Development of Technical Institutes in Ohio

Degree granted Ph. D., Date 1973, No. of pages in report 326

Granted by The Ohio State University Colombus, Ohio
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The origin of technical education is tied very closely with the vocational education movement. Technical education is a part of, or a division of, vocational education. Vocational education received national attention providing the impetus for development through the Vocational Education Act of 1917 and technical education through the National Defense Education Act of 1958.

The technical education movement in Ohio developed from a few scattered evening programs in 1959 and 1960 to entire campuses chartered exclusively for the training of technicians. This rapid evolution has taken technical institutes through several systems of administration, funding, and titles. These changing patterns are the basis for this developmental study of the seventeen technical institutes operating in Ohio under provisions of c. 3357 of the Ohio, Revised Code.

The historical method of research is used to document the development of technical institutes in Ohio. A mass of primary source material was collected including: legislative acts, minutes of board meetings, personal letters, catalogs, courses of study, and reports. Data were subjected to both external and internal criticism as they were collected, analyzed, and recorded. Philosophies, objectives, curriculums, methods of origin, growth patterns, and the facilities of the technical institutes were documented.

Twelve of the technical institutes have operated under a board of education and the State Board of Education prior to a structure change operating under a board of trustees and the Ohio Board of Regents. The State Department of Education was responsible for the early development of technical institutes, providing operating and equipment funds. From 1958 to 1963, the State Department of Education was the only state agency providing leadership and funds to technical institutes. From 1963 to 1971 both the Department of Education and the Ohio Board of Regents were involved directly. House Bill 531, passed by the 109th Ohio General Assembly, placed the responsibility of operating and funding technical education with the Ohio Board of Regents. The Regents have considerably increased the operational and capital funding for technical institutes.

A history of the Clark Technical College, Stark Technical College, Jefferson County Technical Institute, Columbus Technical Institute, Owens Technical College, Northwest Technical College, North Central Ohio Technical College, Hocking Technical College, Cincinnati Technical College, Muskingum Area Technical College, Terra Technical College, Scioto Technical College, Marion Technical College, Central Ohio Technical College, Belmont Technical College, Lima Technical College, and Washington Technical College are included in the study.

Throughout the years of development, the philosophies and objectives of the technical institutes have remained career oriented. Curriculums have remained technical although the general portion of the curriculums have become more "collegiate." The autonomy of the technical institutes, now protected by c. 3357 of the Ohio, Revised Code, enables them to develop and grow according to their local needs and objectives and offer high quality programs with increased enrollments. The evidence of this study indicates that at this point in time collegiate pressures have not weakened technical programs offered at technical institutes in Ohio. Order No. 73-26,860, 326 pages.

34: 2474-A Nov '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Ludlow (Last name), Gerald (First name), Clayberg (Middle name)

Exact Title A Comparison of Student Achievement in Individualized and Traditional Electricity-Electronics Programs and the Effects of Educators' Attitudes.

Degree granted Ed. D., Date 1973, No. of pages in report 95

Granted by Oregon State University (Name of institution) Corvallis, Oregon (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

The study was designed to determine if students using the individualized instruction method, scored significantly higher on a 30 question achievement test than did students in more traditional group paced programs. The study also attempted to determine if attitudes displayed by educators, as measured on an attitude scale, aided in the implementation of individualized instructional programs. The specific questions formulated to investigate this study were:

1. Do students who have been taught in individualized instruction programs achieve at a higher level than students taught in more traditional graded programs?
2. Are the attitudes of educators who implement innovative programs the same as the attitudes of educators who continue with traditional teaching methods?
3. Does in-service training dealing with solving implementation problems have any appreciable effect on the attitudes of educators who are implementing innovative programs?
4. Is a positive attitude towards innovation by teachers, counselors and administrators evident and measureable?

Procedure

The selected population of students and instructors participating in the study was from Oregon's community colleges and secondary schools. Fifty-four high school and community college educators responded to both pre-test and post test instruments by the cut-off date resulting in an 87% return. One hundred sixty-three high school students and 107 community college students responded to a pre-test and post test instrument by the cut-off date resulting in a 70% return.

Student achievement was measured by an achievement test (Appendix A) administered by each participating secondary school and community college teacher in a pre-test/post test design as outlined by Campbell and Stanley (1963). The raw scores were compiled and recorded according to population category.

The attitudes of the teachers, counselors and administrators were measured with the use of the Rokeach Dogmatism Scale (Appendix A). All of the teachers, counselors and administrators who were involved with the electricity-electronics students responded to the scale. The scales were administered in the same pre-test/post test pattern as the student achievement test and at the same point in time. The scores were compiled and recorded according to population category.

Analysis of Data

The one-way analysis of covariance with unequal n's was used to analyze the statistical significance of (1) student achievement levels at both secondary schools and community colleges, and (2) teachers,' counselors' and administrators' attitudes towards innovation at both secondary schools and community colleges. The statistical analysis was accomplished by computer programming.

Summary of Findings

1. The results of the study indicated there was no difference in the achievement levels of secondary school students taught by individualized instruction methods as compared to traditional methods in electricity-electronics courses. According to the questionnaire scores in this study, the type of teaching method used in this particular subject indicated no substantial difference in student achievement.
2. Further results indicated there was no difference in the achievement level of community college students taught by individualized instruction methods as compared to traditional methods in electricity-electronics courses or electronics technology courses. According to the questionnaire scores in this study, the type of teaching method used for this particular subject indicated no substantial difference in student achievement.
3. Based upon the scores of the modified Rokeach Dogmatism Scale both secondary school and community college educators exhibited equal supportive attitudes towards those people they worked with.
4. Secondary school and community college educators did differ sharply in their dogmatic attitudes depending upon whether or not they were involved in implementing innovative programs. The scores as indicated on the modified Rokeach Dogmatism Scale showed that the innovative group was much less dogmatic than the traditional group in the pre-test and that this difference widened significantly at the post test.
5. The control group of educators exhibited a rigid attitude at the pre-test and this attitude became more rigid at the post test. The experimental group, on the other hand, tended toward a flexible attitude at the pre-test and this attitude was even more flexible at the post test.
6. The increasingly less dogmatic and flexible attitudes of the experimental group of educators as shown by the scores on the post test indicated that in-service training might have been a factor in reinforcing positive attitudes towards innovation and towards continued implementation of innovative programs.
7. The scores of the experimental group of educators clearly indicated that teachers, counselors and administrators had to be in accord before implementation and continuation of innovative programs was successful in both secondary schools and community colleges.

Order No. 73-12,867, 95 pages.
33: 6650-A June '73

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Lyman, Jay, Rich
(Last name) (First name) (Middle name)

Exact Title Comparative Costs of Manpower Education: A Methodological Study

Degree granted Ph. D., Date 1972, No. of pages in report 128

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

If the labor force is to meet the changing demands of industry, the skills supplied must also change. Therefore, over time, one can expect the skill mix and skill levels taught to labor force trainees to change, if the educational sector is viable. This study was undertaken to provide a methodology whereby the informational input from industry to the educational sector may be improved. The objective is to establish a criteria and model for comparative evaluation of Manpower Educational Programs.

The criteria developed here deals with resource allocation in manpower educational programs, and also how well those programs meet the needs of industry. Efficiency is measured by how close the educational program comes to meeting the skill requirements of employers. Most analysis dealing with comparative measures of efficiency are some form of cost-benefit analysis. Such studies compare resource requirements for each project and the benefits resulting from them. This type of analysis may be viewed as an external analysis. If the objective is to obtain some optimum allocation of resources, it will be necessary to consider an internal evaluation as well as an external comparison. If the internal structure of many investment projects were altered to improve their efficiency, the external analysis would yield different results. The method developed here is to take the analysis to a new depth, and make an internal comparison of educational programs.

An occupation is reduced to its basic skills, which are called characteristics. The list of characteristics constitutes the specific skills employers demand when employing workers in a given occupation. This list of characteristics becomes a vector of characteristics associated with that specific occupation. A relative price is associated with each characteristic. These relative prices become a vector of relative weights which the employer places on the corresponding elements in the vector of characteristics. Price theory suggests that there should be a relationship between the relative prices and the allocation of resources in the process of producing the various characteristics.

Labor market imperfections prevent the market from transmitting the information input from industry to the educational program. To circumvent this problem, a point plan of job evaluation is adapted for use in evaluating the characteristics. A vector of relative prices is generated, using the point plan for evaluation. A modified price vector is obtained when certain constraints are placed on the characteristics and their prices. The modified price vector is used to provide a relative measure of efficiency between the various educational programs employing the same type of inputs and obtaining similar outputs.

Costs and resource allocation in educational programs, by program, is very difficult to come by. For this reason, time allocation was used as a dummy variable for resource allocation. This assumption presupposes some degree of perfection in the market for educational resources.

Efficiency is measured by the Euclidean distance between the modified price vector and the vector of instructional times allocated to the curriculum. The smaller the Euclidean distance, the closer the school is to meeting the demands of industry.

An empirical application of the model was made using programs in California which are training Airframe and Powerplant Mechanics. The lack of some data required arbitrary assumptions, therefore, the statistical findings of the application are not valid. There are, however, valid conclusions to be drawn from the study. Order No. 73-8335, 128 pages.

33: 5625-A April '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author McGinnis (Last name), Patrick (First name), Thomas (Middle name)

Exact Title A Study of the Effect of Cooperative Voactional Education Upon Student Self Concept and School Achievement

Degree granted Ed. D., Date 1972, No. of pages in report 98

Granted by The University of Nebraska (Name of institution) Lincoln, Nebraska (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to investigate the effect of participation in a Pilot Cooperative Vocational Education (CVE) Program upon self concept development and school achievement. Specifically, it was hypothesized that CVE participants would exhibit significantly more positive self concept development and greater increases in classroom achievement than would non-partitipants. Further, it was hypothesized that CVE participant self concept growth would be significantly and positively related to employers' ratings of job performance, to participants' perceptions of employment supervisors as significant others, and to participants' pattern of school achievement.

The sample selected consisted of residents of Father Flanagan's Boys' Home, Boys Town, Nebraska, a residential care center for homeless and disadvantaged boys. Each was enrolled in the senior class of Boys Town High School during the 1970-71 academic year. The experimental group (Group I) of twenty-three completed a traditional school program during the first semester. This group participated in the CVE program of half-day supervised employment experience related to their prior vocational training and a half-day of regular school attendance during the second semester. A control group (Group II) of equal size was randomly selected from the balance of the senior class, none of whom participated in the CVE Program.

Bills' High School Index of Adjustment and Values (HSIAV), Self Form, was utilized to assess self concept. The HSIAV was administered to Group I and Group II immediately prior to as well as at the conclusion of the second semester. Grade Point Average (GPA) was employed as an index of school achievement and was determined for both groups at the end of both the first and second semesters.

Using analysis of covariance, CVE participants exhibited significant (at the .01 level of confidence) increase in self concept when compared with the non-participant control group. However, no significant difference in school achievement was found between participants and non-participants. Furthermore, using part correlation, no significant relationship was found between CVE participant self concept growth and the employer's rating of participant performance, the participant's perception of his employment supervisor as a significant other, or the participant's pattern of school achievement.

It was concluded that participants in CVE programs achieved positive self concept growth. This conclusion is supported in the literature. In the absence of expected relationships among the other variables involved in this study, a finding which runs counter to self concept literature, it is suggested that further study be given these issues.

Programs of cooperative vocational education seem to possess considerable potential to facilitate positive self concept development. However, further study needs to be given CVE so as to determine those conditions under which self concept development can most effectively be achieved.

Order No. 72-27,407, 98 pages.

33: 1768-B Oct. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author McKenna (Last name), Constance (First name), Viens (Middle name)

Exact Title Employment and Career Potential for ParaProfessionals Utilizing Home Economics Knowledge and Skills

Degree granted Ph. D, Date 1971, No. of pages in report 153

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

During the decade of the sixties, human service agencies employed a rapidly increasing number of paraprofessionals to augment the ability of various agency programs to meet the demands of society.

This study was designed to determine the employment patterns and career opportunities for paraprofessionals utilizing home economics knowledge and skills as an integral part of duties performed in human service agencies. Further purposes were: to identify paraprofessional positions in which home economics knowledge and skills were an integral part of duties performed, to determine the type of home economics knowledge and skills utilized by paraprofessionals and the extent to which they were applied in the performance of duties, to describe paraprofessionals and their role as perceived by professionals and paraprofessionals, and to determine the opportunity for and interest in career development within the agency.

Interviews were conducted with thirty-four professionals in selected Connecticut human service agencies identified by a special advisory group. Participating professionals then identified paraprofessionals and provided the time and place for interviews. The guided interview technique was used for collecting data from 132 paraprofessionals, representing thirty-four per cent of the total population of paraprofessionals employed in agency programs included in the study.

Analysis of data was directed at describing the paraprofessional group under study in terms of frequency and per cent of occurrences under investigation. Range, median and mean were calculated where helpful for analysis of data. In addition, chi square was used to compare data between perceptions of professionals and paraprofessionals of selected factors.

Conclusions based on the findings and analysis of data are:

1. Home economics knowledge and skills are used as an integral part of duties performed by paraprofessionals in individual and family maintenance, homemaking and nutrition education, child/youth care and education and community relations programs in Connecticut human service agencies.
2. The role of the paraprofessionals in relation to other positions on the staff varies widely but generally extends and/or expands professional outreach.
3. Paraprofessionals make a positive contribution to human service agency programs.
4. As a result of employment experiences in human service agencies, paraprofessionals change both personally and in their attitudes towards the community and the families served.
5. As an occupational group paraprofessionals represent individuals widely diverse in age, educational background, and work experience.
6. Paraprofessionals want training, education and career development opportunity within the agencies on a continuum of levels from entry to professional.
7. Career opportunity for paraprofessionals in human service agencies in Connecticut is generally limited to less than professional status.
8. Professionals in human service agencies in Connecticut are interested in providing paraprofessionals with improved training and educational opportunities for upgrading in immediate job performance and for career development.

All of the professionals were in favor of the concept of a city educational center to provide comprehensive core training for all paraprofessionals in a municipal area. Over ninety per cent of the professionals reported that curriculum experiences oriented around family problem-solving related to the utilization of home economics knowledge and skills would be valuable to paraprofessionals.

Major implications for further research are that:

1. studies be undertaken to develop guidelines, including both quantitative and qualitative measures, for evaluating the job performance of paraprofessionals who use home economics knowledge and skills as an integral part of duties performed in human service agencies
2. efforts of home economists be directed at translating middle class oriented competencies and content into the cultural patterns of minority groups and at the performance levels of the clientele that paraprofessionals in human service agencies serve
3. inquiry be directed into the professional's and paraprofessional's perceptions of the paraprofessional's
   - a. personal change
   - b. change in attitude toward the community
   - c. aspirations
   - d. major job responsibilities

to confirm or refute, and further explain the significant differences reported.

Order No. 71-29,893, 153 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author McPherson (Last name), William (First name), Harvey (Middle name)

Exact Title An Interpretation of the Ideas, Philosophy and Contributions Of Frederick Gordon Bonser

Degree granted Ed. D., Date 1972, No. of pages in report

Granted by University of Maryland (Name of institution) College Park, Maryland (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Bonser's ideas and philosophy were influenced by the historical events taking place around him. Living in a rapidly changing American Society, Bonser found himself amid a "revolution" in the area of education. The philosophies and ideas of such European educators as Pestalozzi, Froebel and Herbart stimulated the minds of the leaders of the progressive education movement in the United States. With these men, (Charles DeGarmo, Charles and Frank McMurry, Francis W. Parker, John Dewey, Edward L. Thorndike, Abraham Flexner, James E. Russell, and William H. Kilpatrick) Bonser was to have close personal contact. Bonser and many of these educators were to serve on the faculty of Teachers College, Columbia University. Teachers College became one of the most influential institutions promoting the advancement of the progressive education in the United States.

As an out-growth of the Speyer School experiment, the Speyer School Curriculum was published. This publication gradually showed the type of curriculum that Bonser advocated for the elementary school system. The first achievement was the establishment of the first "general shop" and/or multi-activity classroom. This can be found in Bonser's early professional writings and the Speyer School Curriculum. Bonser's second accomplishment was his contribtuion to the Russell/Bonser Plan and/or the Industrial Social Theory. Bonser's third contribution to industrial arts was his widely published definition of industrial arts, considered by some to be the first such definition.

Frederick Gordon Bonser was a leader in the development of industrial arts as part of general education. Through the study of men like him a better understanding of the place and purpose of industrial arts in the school curriculum can be attained.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Macaluso, Michael, Daniel
(Last name) (First name) (Middle name)

Exact Title A Study to Identify the Need for, Functions, and Competencies of a Media Professional In Industry

Degree granted Ed. D., Date 1972, No. of pages in report 141

Granted by Temple University Philadelphia, Pennsylvania
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Authorities suggest the need for media professionals in all fields of endeavor, including industry. Industrial training and development problems are essentially the same as those in education. The problems are compounded, however, by the knowledge explosion and the increased costs of training and development. If effective and efficient industrial training programs are to be developed, media professionals who can organize effective and efficient training programs are necessary.

The purpose of this study was to identify the need for, the functions, and competencies of the media professional in industry. If the Media Professional has something to offer to educational institutions, it may be that his service would serve a useful and prolific function should he direct his energy to the field of industrial training and development.

Should the Media Professional desire to become a member of the industrial training staff, it would appear that his chances of being accepted by industry are increased when he has an awareness of the qualifications and training that industry desires.

The following questions were answered in the research conducted for this investigation:

1. Is there a present need for a media professional in industry?
2. Which of the media functions identified for a media professional in education are required to be performed by a media professional in industry?
3. What additional competencies must the media professional in industry possess other than those competencies related to each media function?

The procedures employed to collect the data pertinent to this study included the following:

1. A review of the available literature related to training and development programs in industry, from the field of educational media, and from correspondence and personal interviews with training directors.
2. A tabulation of responses to a questionnaire devised by the investigator with the assistance of his advisory committee. Part I of the questionnaire was developed to identify the type, size and present training activities of the companies represented in the sample population. Part II of the questionnaire was designed to determine the desirability of the employment of a media professional as a member of an industrial training staff. Part III was developed to identify the media functions and additional competencies, other than those competencies related to each function, desired of a media professional in industry.

The questionnaire was submitted to selected members of the American Society For Training And Development. It is the only professional society devoted exclusively to the education, development and expansion of the skills and standards of members of the training and development profession.

The survey was a random sampling of selected members from the 1970 American Society For Training And Development Membership Directory. The members to whom the questionnaire was directed were, in most cases, training directors, training managers, managers of management development, and others responsible for training programs.

On the basis of the research conducted for this study, the following conclusions were made:

1. As a result of the expanded use of media, those responsible for their company's training programs are confronted with the unique problem of rising inventories of equipment and materials without qualified personnel to assist in their proper implementation and utilization. With the continued rapid advancement of scientific and technological innovations in mediated instruction, the need for a media professional in industry continues to increase.
2. Not only is there a present need for a media professional in industry, but that a greater need is anticipated within the next five years. The actual number of media professionals needed in industry is dependent, to a great extent, on the number of companies in each industry, the number of employees to be trained, and the sophistication of the training program.
3. Educational media programs in colleges and universities should deliberately focus upon the educational media professional in industry, since their functions are the same.
4. Because industry indicates the need for media professionals in the next five years, there is likely to be a demand for persons with such qualifications. Interested persons should be urged to enter the industrial media field. Educational institutions should take this into account in their recruiting and program development. Need will be most likely felt in the Cosmetics, Drugs and Pharmaceuticals, Electronics and Computers; Banking, Finance and Insurance, and Transportation and Related Manufacturing industries.
5. According to industrial leaders, educational media professional, should receive extensive training in Psychology-Sociology, and Communications areas as opposed to Business Administration-Economics.
6. The successful integration of the multi-facet training materials into the present industrial atmosphere will depend heavily upon the availability of a media professional to assist in their proper utilization, and to amplify the efforts of those responsible for their company's training programs.
7. The need for a media professional and the competencies expected of him must receive more conscientious attention from industrial management, if the demand for more effective and efficient training programs are to be met.
8. The broad range of opinion among the members of the American Society For training And Development regarding specified functions and competencies of a media professional indicates the need for an indepth study for each specific industry.

Order No. 72-20,198, 141 pages.

33: 1478-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Mali, Paul,
(Last name) (First name) (Middle name)

Exact Title A Model for Establishing an Obsolescence Indication for Practicing Electrical Engineers

Degree granted Ph. D., Date 1966, No. of pages in report 192

Granted by University of Connecticut Storrs, Connecticut
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was concerned with technological obsolescence as it pertains to practicing electrical engineers. The basic approach was to obtain agreement from a jury of consultants on a listing of new technologies of recent advance and apply it to practicing engineers who self-determine what they believe to be their level of understanding of each of these technologies. An obsolescence index was utilized to measure the deviation from the jury established criteria which was used as a model for the study.

Five hundred and ninety-three electrical engineers participated in the study from a major defense corporation with six divisions scattered nationally. Data was gathered with the use of committees, thirty-one jury consultants, two questionnaires and forty-three group interviews.

The major findings of the study were:

1. Fourteen new or expanding technologies were recognized by a jury of experts as constituting areas of rapid obsolescence.
2. Technical personnel in the field over five years need upgrading in engineering fundamentals in these areas of rapid obsolescence.
3. Currentness in the field was indicated by an obsolescence index and declined with increased chronological age, years out of school, and type of activities in employment.
4. Practicing electrical engineers, on the average, saw themselves as falling behind in the field.
5. Level of utilization of engineering skills was discovered in 48.9 percent of the practitioners as below their capability or in the range of a technician.
6. A two-to-one demand in time was placed on engineering practitioners for non-engineering activities.

Recommendations are made, based on the findings of the study, that engineering management take action on the following:

1. Educational renewal programs should be set up within the company and technical personnel of long service should be required to participate.
2. A program of obsolescence awareness should be instituted and its abatement promoted within the company.
3. A system of incentives should be instituted for the practitioners to involve themselves more actively in their professional associations, meetings, and publications.
4. A skills appraisal system should be set up in which the engineer can be heard by his supervisor on his utilization on the job.
5. A guidance counseling section should be set up within the company where a practitioner may get professional guidance and direction to maintain himself in the field.
6. Technical aid assistance should be provided to remove some of the non-engineering activities he is expected to accomplish. Microfilm $3.00; Xerography $8.60. 192 pages.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Martin, Dariel, Dee
(Last name) (First name) (Middle name)

Exact Title A Study of Professional Education Competencies and Community College Administrators of Vocational Education

Degree granted Ed. D., Date 1972, No. of pages in report 179

Granted by Oregon State University Corvallis, Oregon
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purposes of the Study

The study had several purposes, the major one being to identify common professional education competencies essential to adequate performance by administrators of vocational education at the community college level. Other purposes of the study were to: (1) determine if significant differences existed in vocational administration competencies among respondents as categorized by state institution, position held, and proportion of time devoted to teaching; (2) determine the extent of commonality among individual community college administrators of vocational education according to values given the 98 professional education competencies included in the study; (3) formulate implications to be considered in the development of curriculum content, performance objectives, and teaching strategies for the preparation of community college administrators of vocational education; and (4) identify the method recommended by the respondents for preparing individuals to perform each competency included in the study.

Procedures

A 98-item mail survey questionnaire was developed through a critical review of literature on professional education competencies in areas of community college, vocational education administration. The questionnaire was designed so that deans and department chairmen could respond to the level of proficiency necessary for each competency in relation to their job. Responses were assigned Likert-type scale values of 5 to 1. The questionnaire also included a checklist designed to reflect the best recommended methods (coursework, on-the-job experience, or a combination of coursework and on-the-job experience) for preparing leadership personnel to perform specific competencies.

A total of 48 community colleges from Arizona, California, Colorado, and Washington who met predetermined criteria agreed to cooperate in the research. A randomized sample of 175 deans/directors and department chairmen involved in vocational education was selected from community colleges participating in the study. One hundred forty-three usable questionnaires were returned and analyzed by utilizing analysis of variance and factor analysis analytic techniques.

Selected Findings

Selected findings were:

1. Except for five competencies, no differences existed between four states represented in the study.
2. Except for five competencies, no differences existed between the 48 community colleges.
3. Twenty-eight competencies were rejected when positions of administrators were compared indicating differences exist.
4. Except for four competencies, no differences existed between respondents in regard to the proportion of time allotted to teaching.
5. A five-factor solution extracted 59 competencies that had factor loadings greater than ± .50.
6. The combination of on-the-job experience and formal coursework was identified as the preferred method of competency preparation.

Conclusions and Recommendations

Fifteen conclusions were presented based on the review of current literature, the questionnaire, and the results of statistical analysis. Five selected conclusions are:

1. The five clusters of competencies identified represent meaningful groups that can form the bases for developing curriculum to prepare community college vocational education administrators.
2. The few differences that occurred between states, community colleges, and teaching responsibilities were attributable to chance.
3. The differences that occurred between positions were interpreted as true differences. Seven competencies were identified as unique to the needs of department chairmen and 21 competencies were identified as unique to the needs of deans.
4. A combination of formal coursework and on-the-job experience is the preferred method of vocational administrator preparation for community colleges.
5. A high degree of similarity exists between the 143 respondents.

Six recommendations were offered in view of the findings and conclusions derived from the study. Two selected recommendations are:

1. That behavioral objectives and individualized instructional packages be developed from competencies in the present study and used to prepare community college administrators of vocational education.
2. That a composite data analysis be conducted on the concurrent studies by Baltimore (1972) and Martin (1972), and the individual study by Sundstrom (1972) to ascertain similarity of results. If strong similarities exist between populations, it was recommended that the western states cooperate in establishing vocational leadership programs with a common base.

Order No. 72-27,635, 179 pages.

33: 1371-A Oct. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Martin (Last name), Gordon (First name), Eugene (Middle name)

Exact Title An Experimental Study Comparing the Relative Effectiveness of a Distributed Versus a Massed Practice Session on the Learning and Retention of a Selected Psychomotor Task

Degree granted Ed. D., Date 1972, No. of pages in report 191

Granted by University of Maryland (Name of institution) College Park, Maryland (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

The problem of this study was to compare the relative effectiveness of a distributed versus a massed practice session on the learning and retention of a selected psychomotor task.

Statement of the Purpose

The purpose of this study was to provide additional research evidence concerning the effectiveness of a distributed and massed practice session on the learning and retention of a selected psychomotor task. An added dimension was used in that male and female students were experimentally compared.

The practice which provided the learners (male and female) an opportunity to develop a higher level of proficiency in a selected psychomotor task and with a greater degree of retention needed to be examined.

Wright (1965) reported that more and more students of all ages were taking industrial arts education courses in the secondary schools. Industrial arts enrollments almost doubled in the period 1949-1961. In 1961, three and one-half million students were enrolled in courses in industrial arts. This represented 29% of all pupils in grades seven through twelve, or an overall increase of three percentage points.

With these and other factors in mind, it seemed appropriate to investigate certain aspects related to efficiency of instruction.

The Experimental Design

The study involved 152 subjects consisting of 76 male and 76 female students. Three variables were considered: treatments, mechanical ability levels and sex differences. The population of subjects was administered the MacQuarrie Test for Mechanical Ability (MTMA) for the purpose of separating students into high and low levels of mechanical ability. The median score obtained for each group by sex was then used as the cut-off point for separation.

The treatments used in the study were a distributed practice group and massed practice group. Each one of the treatment groups then consisted of: high mechanical ability male; high mechanical ability female; low mechanical ability male; and low mechanical ability female students. Therefore, each one of the eight cells consisted of 19 students. From this population of 19 subjects, four students were randomly selected to serve as alternates. An experimental control group was not used in the Parent Study, but was utilized in Pilot Study 2.

The distributed practice groups practiced the psychomotor task with intermittent rest periods. However, the massed practice groups were not allowed any rest periods throughout the practice session. A ten-minute practice session was used by both treatment groups. At the conclusion of the practice sessions, a criterion measure was administered to the treatment groups. Following a one-week delay, a second identical criterion measure was administered for the purpose of measuring retention.

Findings

The three-way factorial analysis of variance was employed to test the seven different hypotheses for initial learning and the seven different hypotheses for retention. A correlation study was also conducted to test for reliability. The findings that follow are summarized under the heading of the dependent variable examined.

Initial learning: The criterion test for learning was administered to all the subjects immediately upon completion of the program. A 2 x 2 x 2 factorial design was applied to the scores in order to test for differences among the treatments, for high and low mechanical ability groups, and for sex differences. All analyses, except the mechanical ability levels, resulted in non-significant findings at the $\alpha = .05$ level of significance. A large significant difference was found for the mechanical ability levels. The high mechanical ability students performed significantly better than the low mechanical ability students. No significant interaction was found between treatments, mechanical ability levels, sex differences, and the combination of the three variables.

Retention: The criterion test for learning was again administered to the subjects after a one-week delay. The application of the three-way factorial analysis of variance indicated somewhat different results than had been obtained on the learning test. All analyses were computed at the $\alpha = .05$ level of significance. An analysis of the treatments indicated no significant difference. However, the divisions by mechanical ability levels and by sex indicated large significant differences. The high mechanical ability students performed significantly better than the low mechanical ability students, while the male students performed significantly better than the female students. No significant interaction was found between treatments, mechanical ability levels, sex differences and the combination of the three variables. Order No. 73-9707, 191 pages.

33: 5531-A April '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Martinez, Leonardo,
(Last name) (First name) (Middle name)

Exact Title A Research Model for Curriculum Development and Evaluation in Occupational Education: Application to Mechanical Technology in the Petroleum Industry of Venezuela

Degree granted Ph. D., Date 1972, No. of pages in report 96

Granted by Michigan State University East Lansing, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to develop a research model that could be used to analyze the skills and knowledge possessed by job incumbents of an occupation in a selected technological area. The model was designed as a tool for curriculum development and evaluation in occupational education and was applied to a random sample of forty mechanical technicians employed by three petroleum firms in Venezuela. The primary objective was to apply the research model in exploring the skills and knowledge possessed by these technicians, the contribution of the school and the job in teaching them and the relative importance of their skills and knowledge in their job performance.

A sort of 84 cards, containing a content item each, was used. The content was drawn from formal and non-formal sources of training, and was classified according to two curriculum variables. Four questions were asked of each incumbent. Six analyses of variance were performed and it was found that if a technician was affiliated with a certain company this had a significant effect on the importance he assigned to the content items of the card sort. This effect was attributed to irregular sampling and differences between firms concerning training and utilization of mechanical technicians.

Using a four-dimensional matrix to analyze the frequencies of responses to the card sort, it was found that there are three major curriculum areas of concern in the preparation of mechanical technicians for these firms: (1) the conceptual area, (2) the application area, and (3) the overlapping area. The role of the school was found to be unique in the conceptual area, although the school participates in teaching some items in the other areas. The role of the job is unique in relation to the management items and almost unique in relation to all other items in the application area.

The research model should prove to be an effective and unique tool for curriculum development and evaluation in occupational education. It is unique in that: (1) it includes content items from formal and non-formal sources of training, (2) it is possible to trace any effect of environmental variables, and (3) it uses two curriculum variables that are independent of one another.

After model application, the technical teacher may use the data for an atomistic interpretation with implications for curriculum improvement. The curriculum developer may use the matrix approach for a systems interpretation of the findings.

It was recommended that the model should be applied in conjunction with other research tools directed to explore influences of affective content and cultural factors, quality of content acquisition and cost-benefit analyses of combinations of formal and non-formal education and training for the preparation of workers in certain occupations. Iterative applications of the model along and across technologies and economic activities may help to identify clusters of content and the basic elements of a general technology curriculum. Finally, some suggestions were made for establishing a process so that the most effective use of the data can be achieved.

Order No. 73-5437, 96 pages.
(33: 4909-A) March '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Masley, Philip, Thomas
(Last name) (First name) (Middle name)

Exact Title The Development of a Curriculum for Non-Farm Agricultural Employment in Connecticut

Degree granted Ph. D., Date 1966, No. of pages in report 261

Granted by University of Connecticut Storrs, Connecticut
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to ascertain non-farm agricultural employment opportunities in Connecticut and to identify distributions of those occupations or job clusters which have potential with regard to curriculum development in vocational agriculture. More specifically, the purpose of this study was: 1. To determine the occupational data pertaining to non-farm agricultural occupations in Connecticut. 2. To derive a basis for the development of new instructional program in non-farm agricultural occupations.

This study was based on data obtained by paid interviewers, from 480 firms. The firms were located in forty-three randomly selected towns representing approximately twenty-five percent of the State population.

Two hundred and ninety job titles were identified in the study. These job titles were classified into eight occupational families, patterned similarly to that established at the Research Coordination Conference on Agricultural Occupations at Ohio State University. Each employer classified each job title reported in one of nine levels of employment ranging from the professional to the semi-skilled. Each level of employment within each family was termed a job cluster.

Employers indicated competencies desired for each job title. These sixty competencies were identified and grouped into thirteen competency clusters.

A measure of degree of competency was calculated in reference to each of the competency clusters for each job cluster. By multiplying degree of competency by number of employees in each job cluster, index scores were obtained.

To facilitate comparisons these indices were organized to form a double matrix as standard scores. Standard scores designated as A indicate the relative importance of thirteen competency clusters for a job cluster. Standard scores designated as B indicate the relative importance of seventy-two job clusters for a competency cluster.

In the 480 firms interviewed, 3475 full-time and 1081 part-time employees were identified in 290 job titles.

Employers in these firms indicated anticipated employment in the next five years of 1064 full-time and 1089 part-time employees.

Eighty-seven associations of job and competency clusters were identified at the discriminatory standard score level of A40-B55 or above.

Occupational data pertaining to the development of programs for high school youth are favorable, in most cases, with regard to age and educational requirements, work experience, residential background, and proficiency in agriculture.

The employment prospects for high school youth and adults are good in non-farm agricultural occupations in Connecticut.

A variety of curricula can be developed for high school pupils and adults for many of the non-farm agricultural occupations identified.

Microfilm $3.40; Xerography $11.95. 261 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Meers (Last name), Gary (First name), Dean (Middle name)

Exact Title Effects of Various Feedback Media on Psychomotor Achievement

Degree granted Ed. D., Date 1972, No. of pages in report 87

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose: The purpose of this study was to ascertain whether or not there is a significantly different level of psychomotor achievement among students who experience the following feedback treatments: (1) evaluating their own performance with the aid of a check sheet while viewing their previous performance by means of videotape recording (Treatment CS); (2) evaluating their own performance with the aid of a rating by a panel of judges while viewing their previous performance by means of videotape recording (Treatment PR); (3) viewing a videotape recording of their previous performance (Treatment SR).

More specifically, the study attempted to answer the following question: What difference in psychomotor achievement would occur among students receiving differing kinds of feedback?

Method of Research: This investigation was conducted as an experimental comparison of three methods of feedback upon psychomotor achievement. The population from which the subjects were drawn consisted of one hundred seventh grade students enrolled in industrial arts at Oakland Junior High School, Columbia, Missouri. The design of the study necessitated that the students be of comparable equivalence. The following variables were used to ascertain group equivalence: (1) age; (2) sex; and, (3) manual dexterity. Thirty-nine male subjects, whose birthdates fell within a six-month range and had equivalent manual dexterity scores, were selected. Manual dexterity was measured by administering the United States Employment Service (USES) Pegboard Apparatus Test of Mental Dexterity. After compiling the data, the subjects were randomly assigned to the treatment groups.

The research procedure followed in the study was to obtain a base rate measure, apply the three treatments, and then obtain a final evaluative measure. The base rate measure was the number of screws correctly driven with a spiral ratchet screwdriver in a two-minute time period. One of the three feedback treatments was administered to the subject and then the screw driving task was performed again to secure an evaluative or final measure.

Conclusions: Students who received the videotape-panel rated feedback treatment had significantly higher levels of psychomotor achievement than did the other two feedback treatment groups. It was concluded that students receiving qualified directive feedback of their performance will perform at a higher level of psychomotor achievement.

No significant differences were found among adjusted group mean scores of students receiving videotape-check sheet or videotape feedback. Therefore, it may be concluded that students receiving feedback in these forms, will perform at a lower level of psychomotor achievement than subjects receiving feedback in the form of a panel rating.

Since the findings of this study indicated that students who received videotape-panel rated feedback performed at a significantly higher level of psychomotor achievement as compared to the two other forms of feedback, qualified directive information concerning their performance will result in higher psychomotor achievement levels. Order No. 73-7062, 87 pages.

(33: 4909-A) March '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Milan (Last name), Joseph (First name), Edward (Middle name)

Exact Title Comparison of Colorado Trade and Industrial Teachers

Degree granted Ph. D., Date 1972, No. of pages in report 153

Granted by Colorado State University (Name of institution) Ft. Collins, Colorado (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The main purpose of this study was to determine what were the differences in the performances of vocationally credentialed trade and industrial teachers with different formal educational backgrounds. The determination was made by comparing teachers with a baccalaureate degree or higher in Vocational Education, teachers with a baccalaureate degree or higher in a discipline other than Vocational Education, and teachers with less than a baccalaureate degree. A secondary purpose was to determine the strength of relationship for some of the characteristics which could be common with the three groups.

The objectives of the study were (1) to evaluate the appropriateness of occupational experience, (2) to evaluate the appropriateness of previous teaching experience, (3) to determine the effectiveness of pertinent vocational education method courses, and (4) to compare the effectiveness of in-service trade and industrial teachers in relation to the educational degree they hold.

The design of the study required three avenues of approach: (1) A biographical profile of the total population of fulltime vocationally credentialed teachers (415 Teachers). Included in the items of the questionnaire were 20 teacher characteristics that were used as variables in the stepwise discriminant analysis; (2) the sample population (60 teachers) selected for the evaluation section of the study included teachers whose programs were evaluated by the Supervisor of Trade and Industrial Education during the school year 1971-1972. The sample population represented 10 trade areas from most of the geographical areas of Colorado. The score assigned the teachers on his evaluation was used to divide the teachers into four groups. A means and standard deviation for each of the 20 variables was tabulated for each of the groups, and using the stepwise discriminant analysis the groups were compared to each other. The results of the analysis indicated that the variable of teacher degree accounted for 90 percent of the variance; (3) the same sample population was also included in a subproblem using a stepwise discriminant analysis and dividing the total sample population into three distinct groups of teachers identifying (a) teachers with a Vocational degree, (b) teachers with a degree other than Vocational, and (c) teachers with less than a baccalaureate degree. The three groups were compared to each other using 20 variables including the scores of the teachers program evaluation.

Based on the results of the analysis the following conclusions were made:

1. Teachers with less than a baccalaureate degree were less effective than those with a vocational degree but were more effective than teachers with a degree other than vocational.
2. The type of educational degree is the most effective predictor of efficiency of performance.
3. The occupational experience above the amount required for credentialling is not as highly significant as other variables.
4. Previous teaching experience is more of a significant variable than the occupational variable.
5. The vocational method courses vary in their significance but pertinent courses are highly significant.

Order No. 73-13,041, 153 pages.

33: 6809-A June '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Miller, Jerry, Louis
(Last name) (First name) (Middle name)

Exact Title An Assessment of the Effects of Aerospace Education Workshops Upon the Teaching of Aerospace Education Concepts in Selected Schools in Oklahoma

Degree granted Ed. D., Date 1972, No. of pages in report 99

Granted by Oklahoma State University Stillwater, Oklahoma
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

SCOPE AND METHOD OF STUDY: The purpose of this study was to determine the effectiveness of the first two annual Oklahoma aerospace education workshops in preparing teachers to teach in the area of aerospace education in the schools of Oklahoma. This study involved the total population of teacher participants who were enrolled in the workshops. Data on the workshop participants was obtained by the use of a questionnaire. Research questions were then utilized to determine the effect that the workshops had in assisting teachers in their classroom activities. Changes in the attitudes of the workshop participants were also obtained.

FINDINGS AND CONCLUSIONS: The results of this study indicate that the Oklahoma aerospace education workshops have been successful in initiating aerospace education in the schools in Oklahoma. Other findings indicate that the teachers who were enrolled in the workshops feel confident in teaching aerospace education concepts in their classrooms. There was a strong response from the participants that the aerospace education workshops should be continued on a state-wide basis.

Order No. 73-15,191, 99 pages.

33: 6776-A June '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Miller,	Mary,	Dupeé
(Last name)	(First name)	(Middle name)

Exact Title A Study to Compare Occupational and Non-Occupational Teachers Regarding Community College Teaching at Selected Community Colleges in Michigan

Degree granted Ph. D., Date 1971, No. of pages in report 196

Granted by The University of Michigan (Name of institution) Ann Arbor, Michigan (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose

The purpose of this study was to make comparisons between Occupational and Non-Occupational teachers on several variables related to community college teaching, to determine whether there were significant differences in their attitudes toward community college teaching regarding these variables, and to make comparisons of Occupational teachers by department regarding their attitudes toward community college teaching.

Procedures

A total of 81 Occupational teachers and 77 Non-Occupational teachers were surveyed from six community colleges in southeastern Michigan. Data were gathered by mailed questionnaires including: 1) demographic data, 2) special preparation to teach at a community college and related work experience, 3) an attitude scale, and 4) a social responsibility scale.

The categorical data were coded and the attitude scale and social responsibility scale were scored. Statistical analyses included frequencies and percentages, chi-square test of distribution to determine significance of frequency data, and t-Test to determine significance between mean scores.

Findings and Conclusions

Conclusions can be drawn from the following significant findings when the comparisons were made between Occupational and Non-Occupational teachers.

1. Occupational teachers are approximately three years older than Non-Occupational teachers.
2. Occupational teachers have taught approximately two years longer in community colleges than Non-Occupational teachers.
3. A high percentage of Occupational teachers did not have a teaching assignment as a last job, a high percentage of Non-Occupational teachers had last taught at a four-year college.
4. For undergraduate preparation, Occupational teachers had attended colleges, universities, trade schools, and technical institutions; Non-Occupational teachers had attended colleges and universities.
5. Occupational teachers had received undergraduate degrees and certificates, and some had no degrees; Non-Occupational teachers had generally received undergraduate degrees.
6. Over half of the Occupational teachers had attended graduate school; most Non-Occupational teachers had attended graduate school.
7. A high percentage of Occupational teachers had work experience related to the field in which they are teaching; over half of the Non-Occupational teachers did not have this experience.
8. Occupational teachers had more positive attitudes toward the community college administration than Non-Occupational teachers.

Of the comparisons that were not significant, the following warrant special emphasis.

1. Occupational and Non-Occupational teachers have had few courses or informal experiences to prepare them for community college teaching.
2. Occupational and Non-Occupational teachers have positive attitudes toward community college teaching
3. Occupational and Non-Occupational teachers have a high degree of social responsibility when measured by the Social Responsibility Scale

When comparisons were made between Occupational and Non-Occupational teachers to determine whether attitudes differed significantly according to specified variables, significant differences were found according to age and years of related work experience.

When comparisons were made for Occupational teachers by department in relation to attitude toward community college teaching, no significant differences were found.

Order No. 72-29,151, 196 pages.

33: 2080-A Nov. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Minkevich, George,
(Last name) (First name) (Middle name)

Exact Title Differences in Self Concept and Other Selected Variables Between Transfer and Occupational Students in a Comprehensive Community College

Degree granted Ph. D., Date 1972, No. of pages in report 123

Granted by St. Louis University St. Louis, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The Problem

It was the purpose of this study to determine whether community college students choosing transfer and occupational programs differed in self concept and other selected academic and demographic variables.

Data were obtained from a proportional stratified random sample of 361 students who were enrolled in English classes at a single comprehensive community college during the Spring semester of 1972. Of the participants 238 were identified as transfer students while 123 were identified as occupational students.

Measures used were a self concept test, the Tennessee Self Concept Scale, and a background information questionnaire. Student personnel records maintained by the college were used to ascertain the high school and college grade point averages. The statistical measures employed were the t-test, chi square analysis, and percentages.

Results

Results of the data indicated that there were no significant differences between transfer and occupational students on the following: self concept; mean age; socio-economic status; father's or mother's educational achievement; high school and college grade point averages; and mean hours of weekly employment. The two groups of students did not differ in terms of the importance attributed to a number of reasons influencing college attendance. The data also revealed that the majority of both transfer and occupational students did not receive financial assistance from any of the following sources: spouse, own full-time employment, a scholarship or loan, veterans or other government benefits, and college work-study. No significant differences were found between the two groups in the degree to which part-time or summer employment contributed to meeting the cost of their education.

Significant differences between transfer and occupational students were found in their distribution according to sex, highest level of planned educational attainment, participation in extra-curricular activities, and the amount of parental financial support. Significant differences were also found in the following two factors influencing college attendance: parents, and possibility of a better job after graduation.

Conclusions

On the basis of the findings in this study, it seems reasonable to conclude that transfer and occupational students have very similar self concepts.

Academic ability, as measured by both high school and college grade point averages, does not seem to influence the choice of a college program. While age was not found to be a significant factor in the choice of a program, the distribution of the students by sex revealed that males tended to choose a transfer rather than an occupational program. The community college seems to draw individuals from all socio-economic levels, but those who come from families where fathers are engaged in professional-managerial occupations are more likely to select a transfer program. The father's or mother's level of educational achievement, however, does not appear to be an important factor contributing to the choice of a transfer or an occupational program. Individuals come to the community college for seemingly the same reasons regardless of the type of curriculum in which they intend to enroll. More occupational students, however, come to college primarily due to parental influence as well as for purposes of obtaining a better job after graduation. While parents of occupational students provide a stronger source of encouragement to attend college, parents of transfer students appear to be a greater source of financial support. Although transfer students participated in a significantly greater number of extra-curricular activities, there was a low rate of participation by both groups. The highest level of planned educational attainment appears to be consistent with the type of program in which they are enrolled.

Order No. 72-31,473, 123 pages.

33: 3300-A Jan '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Moore (Last name), Billy (First name), Mac (Middle name)

Exact Title The Feasibility of a Psychomotor Media Diagnostic Test Model for Industrial Arts.

Degree granted Ed. D., Date 1973 No. of pages in report 192

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To determine the feasibility of a media diagnostic test system and its ability to: 1) produce individual psychomotor learning style profiles, and 2) serve as a model for constructing tests for industrial arts learning environments.

Source of data and method of study: The data for this study was obtained by designing and developing a specific test for the seventh grade population used in this study. This test, which utilized three media forms, was then administered to the population and validated in accordance with the system.

Findings and Conclusions: The correlation between the main phase of the test and the corresponding validation phase was +0.75.

As a result of this study and the data obtained, the following conclusions were drawn:

1. The system is a feasible model capable of predicting individual psychomotor learning style profiles in terms of the ranked effectiveness of the media utilized by a test developed in accordance with the system.
2. Industrial arts teachers who have taken at least two basic educational media courses or similar industrial arts photography production courses should have the basic skills needed to produce a media diagnostic test which consists of basic media forms.
3. Regardless of its position in the administrative sequence, each teaching sequence remains equally valid as a diagnostic element of the total test.
4. Previous experience with the psychomotor activities used in a test system may be more influential in determining an individual's highest media form score than the media form itself.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Moshier, Kenneth, Duane
(Last name) (First name) (Middle name)

Exact Title The Attitudes of Teachers Toward Career Education Goals, and an Assessment of the Extent that the Goals were Incorporated into the Public School Curriculum

Degree granted Ed. D., Date 1973 No. of pages in report 176

Granted by Utah State University Logan, Utah
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To determine the extent that the career education goals as identified in the school-based Comprehensive Career Education Model were incorporated into the K-12 curriculum of the public schools as perceived by classroom teachers; and the extent that the goals should be incorporated into the curriculum.

Source of data and method of study: An opionaire based on the Comprehensive Career Education Goals was developed for each grade, K-12. The responses from 593 K-12 teachers was used in the study. A contingency table was used to tabulate the data, and a percentage analysis and a proportional test of significance was used to make a comparison between the present and recommended emphasis of the goals in the curriculum.

Findings and Conclusions:

The findings and conclusions indicated that the career education goals as identified in the Comprehensive Career Education Model have sufficient merit to warrant their inclusion into the public school curriculum, and the kindegarten through twelfth grade teachers would support the inclusion of the goals in the curriculum. The lower elementary (K-4) career education goals emphasized concepts in the affective domain; therefore, the goals were taught to a greater degree at this level than was true for the other grade levels. The mathematics and science teachers would be less willing to support the career education concepts than would the teachers in the other discipline areas at the secondary level (7-12).

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Moss (Last name), Roger (First name), William, Jr. (Middle name)

Exact Title Master Builders: A History of the Colonial Philadelphia Building Trades.

Degree granted Ph. D., Date 1972, No. of pages in report 255

Granted by University of Delaware (Name of institution) Newark, Deleware (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study is to trace the development of the colonial Philadelphia building crafts and the place of the artisans of these crafts in the city they created, 1682-1790. Particular emphasis is given to the house-carpenters who, by the late colonial period, were the most powerful and influential of all the city crafts. Formed into three companies, the house-carpenters gained positions of wealth and power, were active in several levels of government from the seventeenth century, leaders of the Revolution, and supporters of the Federal Constitution. These builders have been divided into four generations and are discussed in terms of craft development, political activity, craft organization, and economic class. The emphasis is on the builders rather than their buildings.

Order No. 72-32,008, 255 pages.

33: 2841-A Dec. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Muehlig, John, Edward
(Last name) (First name) (Middle name)

Exact Title Participatory Decision Making in Higher Education and Industry: A Comparative Analysis and Evaluation of Organizational Systems of Administration in Higher Educational Institutions and Industrial Concerns.

Degree granted Ph. D., Date 1973, No. of pages in report 285

Granted by New York University (Name of institution) Washington Square, New York (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this exploratory study was to establish criteria for the development of effective participatory decision making processes through a comparative analysis of two types and sizes of organizational administrative systems: large and small higher educational systems in relation to faculty participation in operation and governance and large and small industrial systems in relation to employee participation in operation and governance. A three phase instrument was designed to accomplish this containing 80 items and was tested in a pilot study at Sarah Lawrence College and Chanel, Inc., and found valid and reliable.

The first phase included items relating to an examination and comparison of ten dimensions in higher educational and industrial systems to evaluate their individual effectiveness for participation and employed a (2x2) analysis of variance design. Comparisons were made using two types of respondents from two sizes of administrative systems; a faculty group from three large and three small higher educational systems and a professional employee group from three large and three small industrial systems equaling twelve systems and 470 respondents in all.

The second phase of the questionnaire ascertained the impact that participation had on the decision making processes through a performance analysis of the five areas of decisions by evaluating the degree of faculty and employee participation within each decision type. An analysis of variance was instituted between these groups based on a (2x2) factorial design and employed scores for both present and desired categories.

The third phase of the questionnaire examined similarities and differences in responses when categorized in terms of various sub-group demographic characteristics showing, specifically, which dimensional and decision area mean scores were different than those of the group as a whole. The product moment correlation coefficient formula was applied and provided an index of this relationship. In addition, a one-way analysis of variance was employed and compared the occupational fields of specialization between these groups and the variables involved.

Three hypotheses were answered by this research: (1) Large systems of administration are more conducive to participation than small ones. (2) Higher educational institutions have poorer administrative systems for the development of participatory decision making processes than certain of those utilized by industry. (3) Employees in business and industry are more active in participatory decision making than faculties in higher education.

The results of this study supported the first two hypotheses as stated at the .05 level of significance but negated the third, indicating that faculties in higher education were slightly more active than employees in industry. When comparing the occupational fields of specialization, these fields were more significantly related to responses from employees in industry than for faculties in higher education. This greater professional expertise restriction gave the participation performance edge to faculties over employees.

The findings suggest that the possession of various system dimensions including goals' management, decentralized structures, democratic leadership, three-way communications, teamwork philosophies and supportive management methods benefit the development of effective participatory decision making processes and, in turn, are conditioned by the type and size of the organizational administrative system. Selection of the appropriate decision making process is influenced by these system dimensions as well as the decision area itself and a number of demographic characteristics relating to the individual participants.

The author recommends that administrators in both higher education and industry must design and maintain organizational administrative systems in which professionals can work efficiently and effectively. They must develop professionals through providing on-going programs, benefits and opportunities for advancement, particularly for the younger faculties in higher educational systems, with known and measurable standards and systematic opportunities to test abilities against these standards so as to mutually achieve system goals.

Order No. 73-19,438, 285 pages.

34: 597-A Aug '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Mueller (Last name), Dennis (First name), Lyle (Middle name)

Exact Title The Educational Needs of High School Woods Teachers in Illinois with Implications for Program Modification in Teacher-Education Institutions.

Degree granted Ed. D., Date 1972, No. of pages in report 148

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

The primary purpose of this study was to identify the educational needs of senior high school industrial arts woods teachers necessary to improve subject matter teaching competence and provide suggestions for the modification of woods programs in teacher-education institutions.

Procedures

The data for this study were obtained from the responses to a questionnaire which consisted primarily of a list of course content topics considered important for inclusion in a total industrial arts woods program, grades nine through twelve. The questionnaire was evaluated by a panel of jurors and sent to 144 senior high school industrial arts woods teachers in the state of Illinois.

The responses of the 90, or 62.5 per cent, who returned the questionnaire were analyzed to determine: (1) the educational and teaching experience background of the respondents, (2) their specific needs for further educational experiences to improve subject matter teaching competence, (3) the relative degree of those needs reported, (4) the relationship between the educational background of the respondents and their responses to each content topic, (5) the relationship between the years of teaching experience of the respondents and their responses to each content topic, and (6) what types of in-service programs or activities the respondents felt would be most effective in assisting them to alleviate teaching deficiencies.

Selected Findings

1. The most preferred types of in-service educational experiences for alleviating subject matter teaching deficiencies were "Technical courses" and "Industrial internships" for graduate credit. 2. The least preferred types of in-service education experiences for alleviating subject matter teaching deficiencies were "Independent studies or practicums" and "Reading textbooks and periodicals." 3. Content topics listed under the heading of Wood Technology received ranks varying from 1 (highest) to 127.5. High ranking topics dealt with wood plasticizing processes, the physical and chemical properties of wood, wood testing, and utilization, and occupations in forestry, lumbering, and wood product research. 4. A relatively high degree of need was expressed for topics pertaining to: (1) Organization and Functions of the Wood Products Industry, (2) Upholstering, and (3) Patternmaking. 5. Respondents expressed relatively little need for further educational experiences in content topics usually included in traditional industrial arts woods programs. 6. Of the 180 chi square calculations to determine the significance of difference between the educational background of the respondents and their reported educational needs only 5 were significant at or above the .05 level. 7. Of the 180 chi square calculations to determine the significance of difference between the teaching experience possessed by the respondents and their reported educational needs only 4 were significant at or above the .05 level.

Selected Conclusions and Implications

1. In-service industrial education woods programs should include a variety of educational activities and experiences in an effort to accommodate the individual preferences of their clientele. 2. Educators responsible for the design and implementation of graduate level industrial education woods programs should offer technical courses and industrial internships as a means of assisting woods teachers in their efforts to alleviate subject matter teaching deficiencies. 3. Educators responsible for the design and implementation of graduate level industrial education woods curricula and in-service programs should include content topics cited in Priorities I and II to enable instructors to teach programs which more fully reflect the skills, processes, and body of knowledge of contemporary wood products industries. 4. Content topics cited in Priorities III and IV were to a large extent concerned with information and skills usually included in industrial arts woods programs. Continued emphasis should be given these topics in graduate and undergraduate industrial education woods programs. 5. The high percentage of need responses to topics pertaining to wood technology suggests the necessity for a contemporary wood technology course in graduate and undergraduate industrial education woods programs. 6. Greater emphasis should be given in graduate and undergraduate woods programs to content topics pertaining to: (1) The Organization and Functions of the Wood Products Industry, (2) Occupational Opportunities in the Wood Products Industry, (3) Patternmaking, and (4) Upholstering. 7. No significant difference exists between the educational background of the senior high school woods teachers represented in this study and their reported educational needs. 8. There is no significant difference between the teaching experience possessed by the senior high school woods teachers represented in this study and their reported educational needs.

Order No. 73-296, 148 pages.

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33: 3345-A Jan '73

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Muller, Arthur, Edwin
(Last name) (First name) (Middle name)

Exact Title A Study to Determine the Fundamental Education and Training Needs of Packaging Personnel for Job Entry into the Packaging Material and Machinery Manufacturing Industries

Degree granted Ed. D., Date 1972, No. of pages in report 149

Granted by University of Northern Colorado Greeley, Colorado
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study was conducted to determine: (1) the educational needs of packaging technologists in the packaging material and packaging machinery manufacturing industries and (2) the extent to which higher education is fulfilling their needs. Specifically this study attempted to identify: (1) the employment status of packaging technologists, (2) the educational backgrounds of present packaging technologists, (3) the recommended areas of education, (4) the work experience backgrounds of employed packaging technologists, (5) how well higher education is fulfilling the educational needs of packaging technologists, (6) how higher education can better fulfill the educational needs of packaging technologists, and (7) which types of higher education institutions should develop packaging technology education programs.

This study was conducted as a survey by questionnaire. While reviewing industrial technology programs five educational background areas for the packaging technologist were identified for inclusion in the questionnaire: (1) general industrial, (2) business, (3) science and mathematics, (4) technical, and (5) packaging technical.

Personnel completing the questionnaire were employees of companies holding a membership in one or more of sixteen technical societies representing the packaging industry.

Data describing the size and type of companies represented were tabulated to determine the number of packaging technologists currently employed, and the estimated need in five years. Education and work experience backgrounds of respondents were analyzed to determine if any pattern existed which lead to current positions. Responses to items in the education section of the questionnaire were treated with the analysis of variance method of statistics. If any significant difference was found, the Sheffe test of multiple comparisons was applied to identify the divergent group.

Companies represented in this study employed approximately 11,600 technical packaging personnel in sales, management, production, and research and development positions. Thirty-six of the cooperating companies anticipated a 5 percent increase in the need for packaging technologists during the five years following this study. Respondents employed by thirty of the forty-eight companies represented stated their present sources of personnel were inadequate. This growth rate plus the replacements for normal employee turnover indicated there is a need to develop additional packaging technology programs.

Approximately 90 percent of the respondents had some college level preparation. About 60 percent of the respondents had earned college degrees. The high percentage of personnel with college degrees and the almost complete lack of program in packaging technology indicated there is a void to be filled by packaging technology programs in higher education institutions.

The respondents were quite consistent in identifying the educational needs of packaging technologists. Respondents evaluated fifty-one items in five educational areas. Only seven items were ranked low by a substantial number of respondents. Ten items rated important were: (1) quality control, (2) packaging material properties, (3) manufacturing cost analysis, (4) structural design of packages, (5) package cost analysis studies, (6) package failure and product damage, (7) packaging and marketing relationships, (8) technical sales, and service, (9) package testing standards, and (10) production planning and control. The technical subject areas identified are a sufficient basis from which to build a packaging technology program.

Respondents indicated in comments that their management capabilities were enhanced by having had varied work experiences and that promotions were dependent upon the successful solution of on the job problems. No definite pattern of work experiences was found which led to any specific job or position.

Higher education institutions were not meeting the technical education needs of packaging technologists and were doing only a barely satisfactory job of meeting related educational needs.

Write in comments identified educational areas in addition to those listed on the questionnaire which would better fulfill the packaging technologists educational needs. Among those noted were: (1) ecological concerns, (2) consumer uses and abuses of packaging, (3) statistics, and (4) governmental agency functions. These findings emphasize the diverse occupational responsibilities and educational needs of the packaging technologist.

A preference for the development of packaging technology programs in colleges and vocational/technical institutes was expressed with vocational/technical institutes being favored slightly. Educators in technical higher education institutions should consider packaging technology programs for addition to their offerings.

In view of the findings of this study the following recommendation for further study is offered: can vocational/technical institutes fulfill the educational needs of a packaging technologist in the limits of a two year program?

Order No. 73-297, 149 pages.
33: 3345-A Jan '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Muncrief (Last name), Martha (First name), Crawford (Middle name)

Exact Title Work Adjustment of Vocational Education Teachers

Degree granted Ph. D., Date 1973, No. of pages in report 116

Granted by The Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to investigate the work adjustment of vocational education teachers. Measures of vocational needs, job satisfaction, and job success were used in testing portions of the Minnesota Theory of Work Adjustment.

A multistage sampling process was used to select teachers of business education, home economics education, and trade and industrial education. State supervisors/teacher educators and high school principals were the two referent groups used in selecting teachers on the basis of job success.

Biographical data were collected relating to age, sex, marital status, race, educational attainment, years in present teaching position, years of teaching experience, and subject matter area. The Minnesota Importance Questionnaire (MIQ) was used to measure vocationally-relevant needs. The Minnesota Satisfaction Questionnaire (MSQ) was used to measure the satisfaction of the individual's needs through work. The occupational reinforcers (ORPs) of the teaching environment were established by previous research done in work adjustment at the University of Minnesota.

Vocational need profiles were compared (1) by subject matter area, (2) for successful and less successful teachers, and (3) for teachers with high, medium, and low job satisfaction. All three types of comparisons yielded very similar profiles. Vocational needs of high importance were: ability utilization, achievement, and social service. Vocational needs of moderate importance were: advancement, company policy, creativity, moral values, responsibility, supervision/human relations, and working conditions. The three vocational needs categorized as being of very low importance were authority, independence, and social status.

Correlation coefficients of .09 to .14 were obtained when the relationship of job success to job satisfaction was examined for the three teaching fields. These low correlations are consistent with the viewpoint that job success and job satisfaction should be conceived of as independent outcomes of the vocational adjustment process.

The main purpose of the study was the prediction of job satisfaction as a function of the correspondence between the reinforcer system of the work environment and the individual's needs. Two statistical correspondence measures were used in combination with the eight variables of biographical data in two separate analyses. The only variable which was found useful in the prediction of job satisfaction was "years in present teaching position."

Overall work adjustment was examined by using the biographical data to compare teachers with high work adjustment (successful/satisfied) and teachers with low work adjustment (less successful/less satisfied). Results indicated that teachers with more years in their present teaching position, with more years of teaching experience, and who were female were more likely to be found in the high work adjustment group.

Work adjustment research is still in the early stages of development. If future studies of work adjustment of teachers are theoretically oriented, they can contribute to building a framework which will be beneficial in vocational counseling.

Order No. 73-26,876, 116 pages.

34: 2475-A Nov '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Murry (Last name), Clair (First name), A. (Middle name)

Exact Title A Test of the Hypothesis of No Relationship Between Concomitant Variables and Air-Conditioning and Regrigeration Trainee Success

Degree granted Ph. D., Date 1972, No. of pages in report 116

Granted by Kansas State University (Name of institution) Manhattan, Kansas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The study represented an attempt to ascertain the success of the air-conditioning and refrigeration instructional training programs offered by the various tax-supported educational agencies in Kansas.

It was proposed that the investigation would delineate the optimum course length for courses with the primary objective of job entry skills.

An attempt was also made to assess the attributes of the entering student that would be most likely to insure his success when measured by his grade point average while in the program and by his income after he had entered the job market.

An additional purpose of the study was to demonstrate a method by which all trade, industrial, and technical courses could be evaluated. It was not intended that this method be restricted to air-conditioning and refrigeration programs alone.

The investigator attempted to survey all air-conditioning and refrigeration students who had attended Kansas public educational institutions in the period beginning August, 1966 and ending September, 1971. The survey was limited to courses whose primary emphasis was the air-conditioning and refrigeration trade areas and to institutions that were offering programs at the time of the survey.

The total population consisted of 209 male students and all were surveyed. Fifty-five subjects, however, were not used in the analysis because of factors causing them to lack either the predictor or the criterion variables needed for the analysis of the data.

A number of null hypothesis were subjected to statistical tests designed to either affirm or disprove their assumptions. These hypotheses stated that there was no positive correlation between twelve independent or predictor variables and the criterions of student grade point averages and graduate income.

Based on the results of an analysis and interpretation of the correlations between the predictor and criterion variables, the following conclusions were formed:

1. Older students received significantly higher income and grades.
2. Prior education measured in years had no significant effect on either the graduate grade point average or his income.
3. High scores on the Henmon-Nelson Tests of Mental Ability correlate with both higher grade point averages and higher graduate income.
4. High school grade point average and General Aptitude Test Battery tests proported to measure general learning ability and manual dexterity were predictors of grade point averages but did not correlate with graduate salarys well enough to attain the .05 level of confidence.
5. The following General Aptitude Test Battery scores were found to be ineffective predictors of both grade point averages and graduate salaries:

V – Verbal aptitude
N – Numerical aptitude
S – Spatial aptitude
P – Form perception

Although the average wages for graduates of Kansas two year air-conditioning and refrigeration instructional offerings averaged $725.74 more for their first year of employment than one-year students, this amount was not enough to compensate the student for his foregone income, interest, and other added expenses. Each successful two-year student represented an added cost to the student and the taxpayer of over $8,900 dollars when his training costs and income were compared to those of the successful one-year graduate.

Order No. 73-13,354, 116 pages.

33: 6810-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Nee (Last name), John (First name), Gerald (Middle name)

Exact Title The Development and Experimental Analysis of a Self-Instructional Program in Graphical Kinematics

Degree granted Ed. D., Date 1972, No. of pages in report 209

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Problem: The purpose of this project was to construct and emprically analyze a self-instructional program. The self-instructional program was drawn from the technical area of graphical analysis of kinematics, and the specific area developed dealt with displacement in machine members. The program was utilized with a target population consisting of post-secondary design and drafting students.

The general objective was to help vocational-technical teachers in the development and experimental analysis of self-instructional programs. The specific objective was to develop a self-instructional program and to verify its effectiveness and efficiency. In order to meet this specific objective, the project developer identified a number of enabling objectives. They were to: (1) determine appropriate subject matter content for a program in the area of graphical kinematics; (2) find effective methods for the development of a program by the manipulation of independent and dependent variables; (3) develop analytical procedures for the identification and improvement of inadequate and ineffective portions of a program; and (4) develop empirical guidelines for writing and evaluating programs of instruction.

Procedure: The project was developmental in nature in that the methods and procedures for developing the program in graphical kinematics were studied and reported on from the initial criterion item specification to the final determination of the program's effectiveness and efficiency.

During the project an attempt was made to define an exhaustive list of criterion items for the unit taught. From this list of criterion items a sample was selected for use in constructing the program and criterion tests.

Three revisions of the program were tested utilizing five major groups of students and one pilot study group. Except for the pilot study group all students were from four different locations in Minnesota and Wisconsin.

The program was administered to all students, except those in the pilot study group, under similar drafting classroom conditions with the same drafting equipment and instructions. The pretests were administered during a two hour period; the self-instructional program, the criterion item posttest, and a questionnaire schedule were administered during a later three hour period.

The project developer examined and analyzed responses made by students to criterion items related to the program.

Findings: The third program revision proved to be the most effective and efficient. The easiness of correct response for the program materials increased from .94 for Revision I to .98 for Revision III.

Data based on the graphical kinematics pretest to posttest gains indicated steady average increases. Revision I had an average pretest to posttest gain of 6.73, while Revision III indicated a gain of 10.11 with 13.00 as a maximum average gain.

The posttest success coefficients steadily increased from .61 for Revision I to .92 for Revision III. The frequency of doubt decreased slightly for all revisions of the program materials.

The informational density for all revisions of the program steadily decreased. This trend indicated a slightly decreasing efficiency for the three revisions of the program materials. The informational speed coefficients for the program materials remained relatively constant.

There was found to be no significant difference between group means for the groups tested in respect to scores earned on the graphical kinematics pretest.

The process of generating criterion items for development of the program and criterion tests was successfully utilized during the developmental project. The analytical methods and empirical guidelines used to determine program content, to discover strengths and weaknesses, and to determine the effectiveness and efficiency of the program proved effective. These same methods should be able to be used effectively by teachers and educational technologists for developing self-instructional programs in other subject areas.

Order No. 73-10,511, 209 pages.

33: 5532-A April '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Nihan (Last name), Georges (First name), Laurent (Middle name)

Exact Title The Determinants of Wages and Occupational Status of Industrial Workers In Belgium: An Analysis of Vocational Education and its Alternatives

Degree granted Ph. D., Date 1973, No. of pages in report 288

Granted by Stanford University (Name of institution) Stanford, California (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this dissertation was to assess the social returns to investing in secondary vocational education and other alternative training programs in Belgium. Various studies have tackled the problem of measuring the economic benefits derived from vocational education, but their very design has biased their conclusions. These studies have overlooked on-the-job training programs and have neglected the responsiveness of the labor market to alternative investments in human capital.

By contrast, this research has focused on the latter problem and has considered the performance of workers in their setting -- the industrial plants -- without discriminating among types of schooling and training received. The formulation of the main hypothesis was closely related to this design. The investigation assumed that workers with alternative training would perform better than their peers with regular vocational schooling and, consequently, would receive higher salaries.

Research data were derived from a survey of nine major plants and one workshop conducted by the investigator in the southern part of Belgium. Trained interviewers questioned 891 workers at their homes. Supplementary information on earnings was obtained from the firms themselves. The survey population was intentionally restricted to workers having no more than secondary schooling.

The sample data were used to estimate earnings and other benefits per age group as a linear function of the variables 1) length and type of schooling, 2) length of training. The model constrained a vector of independent variables such as socio-economic status, late ability, nationality, marital status, experience and achievement drive. Due to the interrelationships among variables, the model used a recursive system with each of the endogenous variables estimated one at a time, sequentially. An innovative construct of this model was the incorporation of benefits other than traditional economic values. The returns were expected not only to encompass increments in earnings, but also to include personal and psychic rewards reflected in higher occupational level, greater job satisfaction and increased training and experience in the trade. In turn, it was also assumed that level of occupation, on-the-job training, and job experience would explain some variance in the estimation of the earnings function as well as variations among each of the same variables taken successively in the equations as criterion.

Despite sampling problems, the findings generally substantiated the hypotheses and the construct of the model: a) After holding constant background variables, the results obtained in the cost-effectiveness and cost-benefit analysis indicated that evening vocational education and on-the-job training alternatives yielded higher earnings differentials than those attributable to the regular day vocational track. The evening vocational program proved also to be a more significant determinant of increments in the occupational status than its day counterpart. b) The use of the recursive model turned out to be an essential factor for disentangling the variables' interrelationships. It was found that education contributes only indirectly to predicting earnings through its impact on the occupational status, which in turn is one of the best determinants of earnings. c) The results obtained in the cost-effectiveness analysis indicated that a study of social returns to investing in education may yield valuable results. The external benefits accrued to society but not captured in the earnings were assessed through different indicators. Among them, the occupational status proved to be highly significant; others, such as workers' satisfaction and unemployment, showed trends worth investigating further.

In sum, the evidence obtained consistently underscored the relative superiority of social investments in alternative programs vis-à-vis day vocational education in Belgium and pointed out that the social returns to this type of schooling may have been overestimated in the past.

Order No. 73-20,505, 288 pages.

34: 1186-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Nothdurft (Last name), Marie (First name), E (Middle name)

Exact Title Industrial Arts As an Instructional Aid in Teaching Educable Mentally Retarded Students in the Large Missouri Secondary Schools

Degree granted Ed. D., Date 1972, No. of pages in report 180

Granted by The University of Wyoming (Name of institution) Cheyenne, Wyoming (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

It was the purpose of this study to bring together information concerning present practices and opinions as to educational provisions made for educable mentally retarded pupils in the area of industrial arts, grades seven through twelve, and to analyze the data to ascertain desirable practices in the implementation of a program of industrial arts.

Procedure

Data pertaining to the problem were obtained by a comprehensive review of literature; review of dissertation abstracts; a study of Federal and State of Missouri legislative action; a review of court actions in related cases; interviews with authorities in the area of industrial arts and special education; and by use of a questionnaire.

The survey was made to determine the practices currently in use in AAA and AA school in Missouri, exclusive of those included in Special Districts, in providing industrial arts experiences and whether there was a need for suggestions to be used in a course of study. Included in the survey instrument were items pertaining to:

(1) organizational practices;
(2) selection of projects;
(3) types of projects;
(4) skill acquisition;
(5) qualifications of IA instructor as related to teaching EMR;
(6) community attitude toward IA experiences for EMR;
(7) specific projects considered as being successful with EMR;
(8) power equipment used and considered safe for use by EMR pupils;
(9) prognostication concerning future programs; and
(10) whether there is a need for functional information.

A 75 percent response to the questionnaire, which required checked and short answer responses, was received from the population.

Conclusions

Among the conclusions were these which were considered to be most appropriate for teachers directly involved in the educational process of EMR pupils on the secondary level.

(1) The number of programs available to EMR pupils on the secondary level is inadequate.
(2) Industrial arts experiences are not being provided as an integral part of the secondary curriculum for all EMR pupils.
(3) Integration of EMR pupils with regular classes appears to be the most prevalent administrative model in use.
(4) The general shop organization plan is predominately used in making industrial arts experiences available to EMR pupils.
(5) Rules and regulations should be applicable to all pupils alike when integration of EMR pupils with regular classes is practiced.
(6) A wide diversity is noted in major areas of work in which EMR pupils participate.
(7) The individual project method is adjudged a successful curriculum approach and the project should be pupil selected with teacher approval.
(8) The projects utilized as vehicles of learning cover a broad spectrum both from the standpoint of type and complexity.
(9) A well delineated plan offering a sequence of skills should be pursued in making IA provisions for EMR pupils.
(10) Printed materials should be limited, possibly to simplified drawings.
(11) The use of mass production is considered as having merit but little supportive action was evident.
(12) The time alloted presentation of content material should be small in comparison to actual 'doing' activities.
(13) Communities are unaware of the value to be gained from industrial arts experiences by the EMR pupil.
(14) The lack of qualified personnel limits the expansion of present IA programs for the EMR pupil.
(15) There is inadequate teacher preparation for those directly involved in providing industrial arts experiences for the EMR pupil.
(16) Special education teachers and industrial arts teachers alike feel the need for help in planning industrial arts experiences for educable mentally retarded pupils.

On the basis of the data provided in this study, suggestions were made to aid in the preparation of a course of study for EMR pupils on the secondary level.

Order No. 72-26,513, 180 pages.

33: 1606-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Nye (Last name), Phares (First name), Steavens (Middle name)

Exact Title A Basic Assessment of the Accrediting Instruments, Activities, and Procedures Used by the Commission on Occupational Education Institutions of the Southern Association of Colleges and Schools

Degree granted Ed. D., Date 1972, No. of pages in report 199

Granted by North Carolina State University (Name of institution) Raleigh, North Carolina (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The study used an evaluative information-feedback loop model to reach the study objectives which were: (a) to establish through the process of identification by a majority of a panel of experts the issues and concerns needing clarification in the accreditation instruments, activities, and procedures used by the Commission on Occupational Education Institutions of the Southern Association of Colleges and Schools and (b) to determine the extent of agreement or disagreement held by the chief administrative officers of accredited institutions as to the affect (including adequacy and effectiveness) of the instruments, activities, and procedures (identified as issues and concerns by the panel of experts) used by the Commission on Occupational Education Institutions of the Southern Association of Colleges and Schools.

The study was conducted in two phases. During Phase I, a panel of experts generated issues and concerns relating to the instruments, activities, and procedures. To obtain the issues and concerns a two-step modified Delphi technique was used. The issues and concerns were transformed into Likert-type statements that could be evaluated by the chief administrative officers of accredited institutions. The statements were returned to the panel of experts as the third Delphi step. The panel of experts refined the statements providing the Phase II questionnaire.

During Phase II of the study, the Likert-type questionnaire was administered to the chief administrative officers of the 29 institutions accredited on or before December 1, 1971 by the Commission on Occupational Education Institutions. The questionnaire was returned by 28 of the 29 chief administrative officers for a percentage of 96.5.

The study revealed that issues and concerns were held by the panel of experts in each Area of Entry. The majority of the issues and concerns of the panel were not necessarily associated with inadequate or ineffective instruments, activities, or procedures used to evaluate and accredit occupational education institutions. Areas needing additional attention included: revision of the self-study manual, additional staff to increase the services of the Commission, criteria for the affiliation review, the development of formats for school reports, establishment of procedures dealing with the process of appeals, reaffirmation or termination of accredited status, and a compilation of the benefits of affiliation and accreditation.

While the chief administrative officers of accredited institutions confirmed several entries by the panel of experts as being issues or concerns that did need improving, they perceive the instruments, activities, and procedures used by the Commission on Occupational Education Institutions as both adequate and effective. They perceive accreditation as being a valuable improvement stimulus for occupational education.

Order No. 73-1200, 199 pages.

33: 3346-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Oglesby (Last name), James (First name), Robert (Middle name)

Exact Title An Analysis of Benefits Accruing to MDTA Trainees in Selected Urban Training Centers

Degree granted Ph. D., Date 1972, No. of pages in report 116

Granted by University of Missouri (Name of institution) Colombia, Missouri (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose: The primary purpose of the study was to discern the extent socio-demographic factors influence earnings, and to ascertain whether such factors were related to benefits associated with institutional Manpower Training courses in selected Missouri cities.

Method of Research: the 371 MDTA trainees used in this study were selected from 518 trainees who previously had completed institutional Manpower Training courses in St. Louis, Kansas City and Joplin, Missouri. Personal interviews were used to gather information regarding socio-demographic characteristics of trainees and their employment history. Additional data concerning the trainees were obtained from the Employment Security Office, the State Department of Education, State Division of Welfare and local schools. Trainees who had completed interview schedules for the six-month, twelve-month, and eighteen-month interview periods were included in this study. This sample represents 52.3 percent of the entire population which initially was 711 trainees.

The dependent variables this study attempted to explain were measured of labor market performance: (1) total before tax earnings (exclusive of fringe benefits) in the eighteen-month period following the end of training, and (2) benefits (earnings eighteen months after training minus earnings prior to training).

The independent variables which conceptually appear to influence the dependent variables were both categorical or dichotomous and continuous. The following independent variables were used in the analysis: (1) age, (2) sex, (3) race, (4) marital status, (5) training centers, (6) job relatedness, (7) length of training, (8) number of dependents, (9) total training cost, (10) prior labor force experience, (11) place of residence before second survey. A new survey instrument was printed incorporating the feedback. The instrument was used to survey the same groups of respondents. 3. The data provided by the second survey were analyzed to provide feedback for a third survey. At this point the group of employers was deleted from the study since zero returns were received from this group. 4. The results of the third survey were analyzed to provide an indication of the responses to the third survey. At this point the group of recent graduates was deleted since they returned only two instruments. 5. Tests for significant difference between survey one and survey three provided the basis for conclusions drawn by this study.

The Pilot Study

A 43-item preliminary instrument was developed and administered to a group of students that were not involved in the Delphi (undergraduate and graduate students). The results of this survey were factor analyzed to eliminate spurious items and group the remaining usable items. Thirty items were identified as suitable for the instrument. These 30 items were placed in the following four groups: 1. Goal statements dealing with student development in the affective domain. 2. Goal statements dealing with student development in the cognitive domain. 3. Goal statements dealing with curriculum flexibility. 4. Goal statements dealing with a student oriented faculty.

Order No. 73-25,355, 116 pages.
34: 2361-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author O'Hara (Last name), James (First name), Stuart (Middle name)

Exact Title Industrial Arts Teaching-Learning Unit Guidelines Development Based on Edcuational Systems Design.

Degree granted Ed. D., Date 1972, No. of pages in report 174

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Industrial arts educators have great potential for helping students achieve the aims and goals of general education. Providing for the total needs of the student is the main purpose of a general education. Achieving this goal, however, is a complex problem.

Robert A. Stager and Charles E. Wales, professors of engineering at West Virginia University, have recently devised an innovative system of instruction consisting of a "guided design." Students simultaneously learn to use concepts to solve open-ended problems. Although this technique was designed and developed for a freshman course in engineering, the authors contend that the method is applicable to course work at any level or in any area of instruction.

This contention by Stager and Wales served as a base for this investigation. It was the purpose of this study to determine whether a beginning industrial arts teaching-learning unit based on the problem solution guidelines developed using Educational Systems Design, could cause learning to occur at the higher cognitive levels as determined by the Florida Taxonomy of Cognitive Behavior.

Guidelines based on Educational Systems Design were developed by the author and incorporated into a beginning industrial arts teaching-learning unit. This teaching-learning unit was used as the experimental treatment and compared with a more conventional industrial arts teaching-learning unit. The null hypothesis tested was the following: There will be no significant difference in performance by subjects instructed using the Educational Systems Design-based teaching-learning unit, and subjects instructed using a more conventional industrial arts unit, as determined by the Florida Taxonomy of Cognitive Behavior.

To test the null hypothesis, two eighth grade industrial arts classes from an area junior high school were selected to participate in the experiment (group A and group B). A crossover experimental design was employed which allowed each class to serve as both the experimental and control group.

The chi-square test of significance was used to test the null hypothesis. Tabulations recorded for each group by trained observers using the Florida Taxonomy of Cognitive Behavior during the control phase were treated as the expected frequencies. Tabulations recorded during the experimental phase of the study were used as observed frequencies. No between-class comparison was attempted.

A comparison of the observations indicated that the students in group A, when subjected to the experimental treatment, performed better at the three higher levels of the Taxonomy, and when subjected to the control treatment performed better at the three lower levels of the Taxonomy. Students in group B, when subjected to the experimental treatment, performed better at all levels of the Taxonomy. The computed chi-square for both groups was significant at greater than the .05 level.

No attempt was made to generalize to a larger population. The performance of both groups, however, at the higher levels of the Florida Taxonomy of Cognitive Behavior indicated that Educational Systems Design-based instruction was a contributing factor in causing students to analyze, synthesize, and evaluate during the learning process.

Order No. 73-12,943, 174 pages.

33: 6154-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Orlando (Last name), Frank (First name), Joseph (Middle name)

Exact Title The Study of Technology: Concept-Statements for Curriculum Development in the Area of Manufacturing

Degree granted Ed. D., Date 1972, No. of pages in report 180

Granted by West Virginia University (Name of institution) Morgantown, West Virginia (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The primary problem of this research was to develop concept-statements, in the area of manufacturing, which could serve as a base for curriculum development for industrial arts teacher education programs utilizing Technology as a discipline base. The area of manufacturing was delimited to the major subdivision of fabricating as it evolved in the United States.

The design of this study was based on two views which have been emphasized in recent literature dealing with the study of Technology: (1) the study of man's work provides a means for understanding Technology both in itself and in its relationships with man and society, and (2) Technology can be more easily understood and studied if it is viewed as a master system having specific and identifiable sub-systems.

Based on an analysis of historical and contemporary literature dealing with the development of manufacturing in the United States, seven specific manufacturing systems, in an evolutionary sequence, were identified and labeled as follows: 1. The Household (pure) System. 2. The Handicraft-Use System. 3. The Handicraft-Retail System. 4. The Handicraft-Wholesale System. 5. The Factory-Basic System. 6. The Factory-Mass Production System. 7. The Factory-Automation System. These seven systems were interacted with the three components which were identified as being the major factors in the study of man's work--organization, work characteristics, and tools--in order to form a two-dimensional matrix. For each of the points of intersection within this matrix, concept-statements were identified.

Taken in its entirety, this concept-statement structure provides a comprehensive conceptual base for the study of manufacturing. Moreover, this study provides support for the following conclusions: 1. Specific concept-statements can be developed which provide a base for determining a curriculum structure in the area of manufacturing. 2. The identification of (a) an evolutionary sequence of specific systems and (b) the primary areas of conceptual understanding for these systems, could provide an effective and efficient means for studying the area of manufacturing. 3. The study of man's work--with particular emphasis on organization, work characteristics, and tools--provides a valid means for achieving technological literacy in the area of manufacturing. 4. The concept-statement structure identified in this research provides one element for the development of curricula for the study of Technology.

Order No. 73-827, 180 pages.

33: 3266-A Jan '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Osborn (Last name), Jimmie (First name), DeWayne (Middle name)

Exact Title Identification of Role and Function for Proposed Research Utilization Specialists in Vocational-Technical Education

Degree granted Ed. D., Date 1972, No. of pages in report 116

Granted by Oklahoma State University (Name of institution) Stillwater, Oklahoma (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

SCOPE AND METHOD OF STUDY: The problem of this study was to identify the role and function of proposed research utilization specialists in vocational-technical education. A number of contemporary forces are urging the creation of professional positions for research utilization specialists. Information about the role and function of these proposed specialists is needed to serve as a basis for planning training programs.

Perceptions relative to the appropriateness and importance of selected roles and functions of proposed research utilization specialists were obtained from state departments and area vocational-technical school personnel in Oklahoma and Nebraska. Data were obtained from eight state department personnel in Oklahoma and seven state department personnel in Nebraska. Three hundred seventy-eight area school administrators, teachers and school board members from fifteen area schools in Oklahoma and seven area schools in Nebraska responded to the questionnaire.

This information was obtained by an instrument that was developed and validated for use in this study. Thirty national leaders in vocational and technical education were used to establish face validity of the instrument.

Data relative to the perceptions of roles and functions of research utilization specialists were examined by making comparisons of the perceptions of the identified roles and functions among and between area vocational-technical school administrators, teachers and school board members in Oklahoma and Nebraska.

FINDINGS AND CONCLUSIONS: It appears that state department personnel view the identified roles and functions to be appropriate and important as indicated by weighted mean response scores. The weighted mean scores also indicate that Nebraska personnel perceived that the most appropriate and important functions are with local school problems, student follow-up, evaluation, research design, assisting teachers and coordinating the adoption of new materials. They perceived the most appropriate and important roles to be in the areas of consulting, coordinating, developing, analyzing and compiling. Oklahoma personnel, on the other hand, perceived the most appropriate and important functions to be those more directly related to the areas of research, design and testing. They perceived the most appropriate and important roles to be in the areas of coordinating, analyzing, consulting, developing, innovating and synthesizing.

Collation of data indicated general agreement in the responses of area vocational-technical school personnel to the appropriateness and importance of selected roles and functions of a research utilization specialist. There were, however, several significant differences at the .05 and .05-.10 probability levels among area school administrators, teachers and board members within each state, in the manner in which they perceived the appropriateness and importance of selected role and function items. Nebraska administrators perceived the production of research design components, orientation to research information systems, anticipation of local educational concerns and assisting in teacher training as being more appropriate and important than did teachers and board members. Oklahoma administrators perceived that developing an extensive review of literature and compiling bibliographies on specific topics were more appropriate and important than did teachers and board members.

Analyses of responses comparing area vocational-technical school counterpart groups between states revealed several significant differences at the .05 and .05-.10 probability levels. While administrators, teacher and board members in Oklahoma and Nebraska perceived the selected roles and functions to be appropriate and important, they differed in their perceptions as to which items were most appropriate and important. Nebraska teachers perceived that familiarity with state and national research systems, identification of new and significant educational developments, student follow-up studies, informing teachers of possible solutions to particular problems, holding inservice training workshops for teachers and providing research data to budget makers were more appropriate and important functions than did Oklahoma teachers. Oklahoma board members perceived the functions of working with a research coordinating staff, field testing constructed research systems, assisting in teacher training and compiling bibliographies on request of local personnel as being more appropriate and important than did Nebraska board members.

Order No. 73-15,207, 116 pages.

33: 6810-A June '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Owens, Hilda, Faye
(Last name) (First name) (Middle name)

Exact Title A Study of Educational Practices Designed to Facilitate Certain Career Education Functions at Six Community Junior Colleges in Florida

Degree granted Ph. D., Date 1973, No. of pages in report 182

Granted b_ The Florida State University Tallahassee, Florida
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to investigate and to describe educational practices designed to facilitate seven career education functions at six randomly selected community junior colleges in Florida. The data was collected primarily through personal interviews with selected student personnel administrators at the six colleges and secondarily from printed materials about the selected colleges and functions. A copy of the semi-structured interview schedule, developed and used by the investigator, is included in the Appendix.

-The career education functions included in the study were: (1) personal assessment in relation to possible careers, (2) dissemination of occupational information, (3) actual selection of an appropriate career, (4) preparation for the selected career, (5) placement in the next level of education or in employment, (6) follow-up in the next level of education or in employment, and (7) evaluation of career education functions.

The career education practices at the six colleges are presented in two chapters: one chapter for the two colleges with enrollments of less than 5,000 students and one chapter for the four colleges with enrollments of over 5,000 students. The final chapter of the study reports forty-six findings, six conclusions, twelve recommendations for community junior college career education programs and six recommendations for further research.

The major conclusions drawn from the data were:

1. All of the participating colleges recognized the importance of career education and were responding with a variety of practices designed to facilitate the career development of students. These practices varied in type and extent; similarities and differences were identified.

2. Although there was considerable cooperation and communication between the personnel in student affairs and academic affairs, improved communication and coordination were necessary for comprehensive and effective career education programs.

3. The personal assessment, dissemination of occupational information, counseling, and preparation programs were the more extensively developed and coordinated functions; placement, follow-up, and evaluation were the less comprehensively developed and coordinated functions.

4. Career education programs generally lacked opportunities for formal instruction, work experiences, seminars and group counseling efforts as a part of the assessment, occupational information and preparation functions. Especially lacking were training components to develop the personal and social competencies needed to accompany job skills for success.

5. Although there were numerous practices designed to facilitate the career education of students, they lacked comprehensive planning, implementation, coordination, and evaluation.

6. Career education was perceived primarily as being for students in specialized technical and vocational programs; consequently, students in the college parallel or transfer programs were excluded from many essential career education practices.

Order No. 73-24,267, 182 pages.

34: 1654-A Oct '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Osorno (Last name), Wendell (First name), Anthony (Middle name)

Exact Title Differentiated Perceptions of Counselor Functions in Iowa Area Vocational-Technical Schhols and Communtiy Colleges

Degree granted Ph. D., Date 1972, No. of pages in report 183

Granted by Iowa State University (Name of institution) Ames, Iowa (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

This study seeks to identify how Area school personnel perceive the counselors' function in Iowa Area vocational-technical schools and community colleges. Specifically, the study sought the perceptions of Area school administrators, counselors, and instructors in order to ascertain:

1. The perceptions of these three groups in regard to the current function(s) of counselors.
2. The perceptions of these three groups in regard to the future function(s) of counselors.
3. The perceptions of these three groups as to whether counselor time should be required on certain specific tasks.

In addition, the study was designed to determine whether any positive relationships exist between seven descriptive variables and the perceptions of the groups studied on counselor functions.

A survey instrument was constructed to elicit responses from Area school personnel on 21 functions and 52 specific tasks commonly performed by counselors in two-year colleges. Data were obtained from 85 administrators, 76 counselors, and 304 instructors in Iowa Area vocational-technical schools and community colleges.

The following statistical methods were used in the analysis of the data:

1. Tabulation of the data using frequency counts and percentages were used to identify those functions and tasks which are endorsed by a majority of Area school administrators, counselors, and instructors.
2. Means, standard deviations, and single-classification analysis of variance "F" tests were computed to test where the observed deviations between the groups studied were too large to be accounted for by chance.
3. Pearson product-moment correlations were computed to test for positive relationships between certain variables.

The following conclusions, which are derived from the findings of this study, may be stated:

1. Area school administrators as a group perceived the counselor currently performing more functions than are currently perceived by counselors and instructors.
2. There is agreement among administrators and instructors that the counselor should be responsible for more functions in the future.
3. Area school counselors are currently involved with functions related to admission, registration, records, placement, financial aids, student activities, as well as guidance and counseling. The Area school counselor was primarily viewed as a generalist who was responsible for many functions currently related to student personnel work.
4. The fact that administrators, counselors, and instructors did not agree on whether the counselor should be responsible for many of the current and future functions indicated that more precise role definitions regarding the counselors' function was needed.
5. The descriptive variables, responsibilities of position, institution's enrollment, and institution's instructional offerings seem to have the highest overall effect on the perception of the counselors' function.
6. Although guidance and counseling tend to remain a primary focus of Area school counselors, it appears that other functions and tasks are being given increasing emphasis.

Order No. 72-26,936, 183 pages.

33: 1446-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author PaDelford (Last name), Harold (First name), Edward (Middle name)

Exact Title An Experimental Comparison of the Effects of Differentially Structured Content on Concept Learning

Degree granted Ph. D., Date 1972, No. of pages in report 184

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The study investigated the effect of advance organizers on the subsequent learning of a body of knowledge. Two different conceptual structures (each drawn from a body of knowledge and presented in an expository advance organizer) were presented to the subjects to determine their differential anchoring effects upon the acquisition of additional, related learning material.

Two technical conceptual structures which reflected differences in the actual job performance of "flexible" and "inflexible" television service repairmen were utilized, one for each treatment group. The structure, given in 1500 word reading texts (with pictures and diagrams), was presented in hierarchical order; concepts with the highest level of inclusiveness presented first and then subsuming concepts presented in order of declining inclusiveness. A criterion instrument was utilized to test the amount of structure acquired by each treatment group.

After a 47 hour lapse, each treatment group read a 3500 word text covering the general field of television and was then administered a criterion instrument which tested for knowledge of functions and relationships of television transmission and reception.

Two control groups were assigned the first two criterion instruments (testing for structure) and a third control group was assigned the criterion instrument which tested for functions and relationships. The control groups were utilized to help determine the naivety of the experimental subjects concerning the technical aspects of television and the degree to which the experimental subjects acquired the structure and knowledge contained in the reading texts.

The population consisted of 157 female volunteers who were university students in an elementary education curriculum. Sixty-two were randomly assigned to Treatments A and B, fifty-nine were randomly assigned to Control Groups A' and B', and thirty-six were assigned to Control Group C'. To determine the aptitude similarity of the experimental and control groups a one-way ANOVA was used to test for differences among the five groups with respect to their mean scores on a college entrance examination.

The experimental subjects who were taught the *inflexible* advance organizer and those who were taught the *flexible* advance organizer earned higher scores on subsequent objective tests measuring knowledge of the conceptual structure and functions of television receivers than comparable subjects who received no advance organizers. The organizers containing the structures were learned to an acceptable degree.

Experimental subjects who were taught either the *inflexible* or *flexible* advance organizer and who subsequently received instruction on aspects of television history, transmission, reception, and servicing earned higher scores on an objective test measuring knowledge of functions and relationships of television transmission and reception than comparable subjects who received no instruction at all. The second reading passage was learned to an acceptable degree.

Experimental subjects who were first taught a *flexible* structure of technical concepts dealing with television receivers (via an advance organizer) and who subsequently received instruction in aspects of television history, transmission, reception, and servicing earned higher scores on an objective test measuring knowledge of functions and relationships of television transmission and reception than comparable subjects who were taught an *inflexible* structure of technical concepts dealing with television receivers and who then received identical subsequent instruction on aspects of television history, transmission, reception, and servicing.

The data supported the hypothesis that the structure of a body of knowledge gained in an expositiory advance organizer does have a differential anchoring effect on the amount of knowledge acquired from a subsequent learning passage.

Order No. 72-27,786, 184 pages.

33: 1478-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Pandolph (Last name), Eugene (First name), J. (Middle name)

Exact Title A Study of Selected Bachground Factors that Relate to Results on the Machine Shop Occupational Competency Examination

Degree granted Ed. D., Date 1972, No. of pages in report 111

Granted by University of Pittsburgh (Name of institution) Pittsburgh, Pennsylvania (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The major purpose of the study was to determine the relationship between selected background factors and results on the Occupational Competency Examination in Machine Shop. The following background factors were examined: age, length of occupational experience, recency of occupational experience, apprenticeship training and education. The background factors served as independent variables in the study. The results of the examination, which included written test scores, performance test scores and the final rating, were selected to serve as dependent variables. Several corelation techniques were used to examine the relationships, since the study involved dichotomous and continuous variables.

Another purpose of the study was to determine the relationship between possible combinations of background factors and results of the occupational competency examination. The stepwise regression procedure was employed to select a multiple regression equation that would provide a useful estimate for each of the criterion variables--written test scores, performance test scores and the final rating.

The study involved 142 subjects who were administered the Machine Shop Occupational Competency Examination at the University of Pittsburgh during the period from 1963 through 1971. All candidates who had taken both the written and performance tests for the first time were included in the study. Due to the revision of the examination the subjects were divided into two groups. Group I included 75 subjects who had taken the examination from 1963 through 1968. Group II included 67 subjects who had taken the examination from 1969 through 1971. The statistical treatment of the data was handled separately for each group.

In general, low correlations were found between the background factors and the results on the occupational competency examination. The correlations for Group I extended from -.270 to .298. Nine of the correlations were negative, two of which were significant. Of the total of eighteen correlations reported for Group I, three were significant at the .05 level and one was significant at the .01 level. Of these, age and the high school program variable were both significantly correlated with performance test scores and the final rating. However, the correlations between age and the criterion variables were negative. The correlation between the high school program variable and the final rating was significant at the .01 level.

The correlations extended from -.231 to .494 for Group II. Five of the correlations were negative, none of which were significant. Of the total of eighteen correlations reported for Group II, two were significant at the .05 level and one was significant at the .01 level. Of these, the high school program variable was significantly correlated with performance test scores and the final rating. In addition, the apprenticeship variable was significantly correlated with written test scores. The correlation (.494) between the high school program variable and performance test scores was the largest reported in the study.

The low correlations in the study were reflected in the results of the stepwise regression analysis. The findings revealed that it was not possible to obtain a combination of more than two independent variables that accounted for a significant proportion of the criterion variance. Regression equations involving two independent variables were obtained in only two of the six cases. In three cases, only one independent variable entered the regression equation. While the relationships were statistically significant in each of the five cases, less than one-fourth of the criterion variance was accounted for by the independent variables involved in these cases.

It was concluded that the selected background factors would not be adequate for predicting the results on the occupational competency examination. Order No. 73-13,268, 111 pages.

33: 6811-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Parker (Last name), David (First name), Warren (Middle name)

Exact Title A Comparison Between Current Industrial Arts Philosophy Expressions Derived from Professional Publications and Their Acceptance by Industrial Arts Teacher Educators.

Degree granted Ed. D., Date 1972, No. of pages in report 167

Granted by Oregon State University (Name of institution) Corvallis, Oregon (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

The purpose of this study was to identify and compare the current written philosophical expressions of industrial arts with the acceptance of these by selected groups of industrial arts teacher educators.

Procedure

The data for this study were obtained through the use of a questionnaire derived from a frequency analysis of selected literature. The questionnaire was administered in teacher training institutions to industrial arts department heads or coordinators and a random member of that department who teaches at least one professional course.

The Kendall Rank Correlation Coefficient, τ (tau); the Kendall Coefficient of Concordance, W; and the Chi-square test were used in statistically analyzing the data.

Conclusions

The following conclusions were drawn from the data obtained in this study:

1. There is a significant relationship of philosophical expressions of industrial arts, as expressed in periodicals, and the acceptance of these expressions by department heads or coordinators and selected members of industrial arts department in teacher education institutions that offer the baccalaureate, masters, and doctoral level degree.
2. There is no significant difference of philosophical expressions between department heads or coordinators and selected members of industrial arts departments in teacher education institutions that offer the baccalaureate, master, and doctoral level degrees.

Recommendations

It is recommended that the findings of this study be taken into consideration by national leaders in industrial arts education in recognition of a need for change to more contemporary philosophy of industrial arts.

It is recommended that national leaders in industrial arts education recognize the need to up-date the philosophy of industrial arts to reflect the philosophical expressions derived from professional publications.

It is further recommended that individuals or institutions take into consideration the findings of this study and recognize the need for change in program purpose before developing further programs in industrial arts.

It is also recommended that further research be conducted to determine the objective criterion used by the respondents to arrive at the results of this study.

Order No. 72-20,757, 167 pages.

33: 2748-A Dec '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Pendleton (Last name), John (First name), Thomas (Middle name)

Exact Title Preferred Characteristics of Prospective Employees: A Comparison of Responses by Employers and Trade and Industrial Education Teachers

Degree granted Ed. D., Date 1973, No. of pages in report 233

Granted by University of Illinois at Urbana (Name of institution) Champaign, Illinois (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Employment has long been regarded as one means through which individuals may satisfy their personal and social needs. The young people of our society, many of whom are included in the large pool of unemployed youth, are faced with a situation containing many factors which work against their ability to gain employment. Among those factors are the state of the economy, Federal and state statutes, labor union regulations, an individual's job preparedness, and his ability to initially secure a job.

This study was primarily concerned with the extent of agreement about the preferences for employee characteristics as expressed by employing firms' Screening Personnel and high school trade and industrial education Teachers' views of those expressed preferences. Both groups of respondents made responses under projected conditions of substantial and low unemployment. Additional research questions were investigated dealing with the firms' use of schools as sources of employees; schools sending graduates to seek employment with specific firms; and the amount and kind of communication which was maintained between Teachers and Screening Personnel regarding characteristics deemed favorable in a prospective employee.

Sixteen Teachers and twenty-six Screening Personnel from three central Illinois communities responded to 145 specific employee characteristics and were interviewed to provide a bases for answering the research questions. The Teachers represented most areas of trade and industrial education while the Screening Personnel represented those firms in which the Teachers indicated their graduates found employment.

The responses to the specific characteristics were tabulated, weighted, and analyzed using a multivariate analysis technique to derive an overall statistic by which comparisons of each group's response under each projected unemployment condition were made. No significant differences were found for any of the conditions tested. Some groups of characteristics included in the analysis did show significance, however, if the variance attributed to the other variables were partialled out. Trade and industrial education Teachers do seem to have a good concept of what Screening Personnel look for when interviewing prospective employees.

Less than one-third of the Screening Personnel indicated looking to the schools for prospective employees. Reliance on walk-ins seemed to account for this finding. Nearly half of the Teachers indicated they sent their graduates to specific firms for employment. Those firms represented suppliers of the school, sponsors of the vocational education programs, or firms known to hire many employees each year. The amount and kind of communication between Teachers and Screening Personnel which existed was limited in both quantity and quality, usually taking the form of informal conversations during chance meetings.

The findings of this study can be used to support the Teachers' belief that they have a good understanding of what Screening Personnel look for in a prospective employee. At the same time it can guide the Teachers in their discussions about those characteristics deemed favorable for employment with both their students and the Screening Personnel in their community. Screening Personnel may also use the findings as they consider the specific characteristics an individual must possess in order to adequately perform and grow on the job.

Order No. 73-17,620, 233 pages.

34: 679-A Aug '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Penner, Wayman, Robert
(Last name) (First name) (Middle name)

Exact Title Perceptions of the Nature and Scope of Adult Vocational Teacher Education Needs as Held by Adult Students, Teachers and Coordinators of Adult Education in Oklahoma Area Vocational-Technical Centers

Degree granted Ed. D., Date 1972, No. of pages in report 133

Granted by Oklahoma State University Stillwater, Oklahoma
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

PURPOSE: The purpose of this study was to identify those behavioral teaching acts or pattern which characterize the effective adult vocational teacher as perceived by students, teachers and coordinators of adult vocational education in the area vocational-technical centers in Oklahoma.

SCOPE AND METHOD OF STUDY: This study was an attempt to identify those behavioral teaching acts or patterns that the effective teacher of adult vocational education would practice or perform. To facilitate this identification process, a questionnaire was structured to obtain responses on a five point rating scale as to the degree that respondents perceived the item to be an adult vocational teacher education need. Items selected for this study were those believed to be most relevant to adult education by a panel of experts and by the directors of the area schools used in the study. The questionnaires were administered to eight coordinators of adult education programs, 70 adult T & I teachers and 865 adult T & I students in the eight selected vocational schools in Oklahoma. The questionnaires were administered during the eight to tenth week of class of the fall term of the 1971-72 school year.

FINDINGS AND CONCLUSIONS: Adult T & I programs have a common emphasis and purpose; that of providing skills for entry level employment or upgrading to meet the ever changing needs of industry. It was observed that these commonalities of objectives warranted a study to identify those behavioral teaching acts which characterize the effective adult vocational teacher. The cumulative mean response by the 943 participants to each behavioral teaching act served as an indicator in determining the extent of agreement to the item and also as an indicator for determining the relative importance of the particular item to other items in the study. The results of this study indicate that adults and adult educators agreed that all of the behaviors in this study are indicative of the ideal adult vocational teacher. They did not agree, however, as to the relative importance of some items. Those items receiving the highest ratings were: (1) Exhibiting enthusiasm and support for the area in which he is teaching, (2) Teaches, practices and enforces preventive shop safety procedures, (3) Giving demonstrations of skills and procedures.

Order No. 73-15,213, 133 pages.

33: 6641-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Phillips (Last name), William (First name), Ambrose (Middle name)

Exact Title The Role of the Vocational Teacher as Perceived by Three Groups: Non-Degree, New-Degree and Experienced Vocational Teachers

Degree granted Ed. D., Date 1973, No. of pages in report 95

Granted by Oregon State University (Name of institution) Corvallis, Oregon (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The Purpose of the Study

The central purpose of this study was to compare the role perceptions of (A) non-degree vocational teachers recruited from business and industry, (B) experienced vocationally certified teachers who had been teaching more than five years, and (C) new-degree vocational education graduates from Oregon State University. The major dimensions included: utilization of the Vocational Industrial Teacher Attitude Scale (VITAS) for gathering the data; analysis of data to determine if there were differences among the three groups in their responses to the 72 item questionnaire; ranking of means for all items in which all three groups had a mean score higher than 4.000; ranking of means for all items in which all three groups had mean scores of less than 2.000; and the formulation of implications to be considered in the training of non-degree teachers for their vocational teaching roles.

The Procedures

The procedure for this study was to submit a questionnaire to the selected population in each of the three groups. The Vocational Industrial Teacher Attitude Scale (VITAS), a questionnaire containing 72 items with a five-point Likert-type scale, was used to gather data. The dependent variable in the study was a score which was judgmentally assigned by subjects to denote the amount of agreement for each of the 72 items included in the scale.

The Data

The F statistic was used to analyze the differences between the mean scores for each item, with the .01 level of significance being used to determine where differences existed among the three groups. A test of Least Significant Difference (L.S.D.) was used to determine where specific differences existed between adjacent means of the three groups which were rejected in the analysis of variance tests.

Selected Findings

Generally, the analysis of variance tests indicated that the three groups were similar in their responses to the 72 items.

Based on the results of the study, it does not seem that a baccalaureate degree is mandatory for perception of the vocational teacher's role. The perception of the instructor's role is one approach to establishing meaningful teacher education programs designed to prepare professionally competent personnel regardless of whether they have prior teacher training experience or not. Order No. 73-25,371, 95 pages.

34: 2477-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Pisani, Joseph, Ralph
(Last name) (First name) (Middle name)

Exact Title Automotive Repair: A Study of Consumer and Repair Shop Attitudes Toward the Industry, the Performance of Repairwork and Regulation

Degree granted Ph. D., Date 1972, No. of pages in report 367

Granted by University of Maryland College Park, Maryland
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The dissertation's purpose is to determine consumers' attitudes toward automotive repair shops, repair service and government regulation and to compare them with repair shops' attitudes toward the same phenomena. The universes studied are the motor-vehicle-owning and repair shop populations of Prince Georges County, Maryland and Travis County, Texas. The study was conducted by mail. Two structured questionnaires were used to collect the data which are based upon the responses of 932 consumers and 438 repair shops from both counties.

A general background on the automotive repair problem and a review of current literature on the automotive repair industry are provided although the amount available is limited. Topics covered include, the development of the automotive repair industry; components of the industry; data on the cost of owning and operating an automobile; the nature of the warranty and nonwarranty repair problems; and, a description of the most common fraudulent and deceptive practices.

The major findings are:

1. The overall quality of warranty and nonwarranty repairwork is substandard in terms of consumer satisfaction.

2. Dealers do not intentionally seek to avoid performance of warranty repairs nor are they incapable of performing them although there is some evidence that they may not attend to them immediately.

3. Consumers favor simpler warranties of longer duration than the present one year/12,000 miles; many view the warranty as a sales gimmick.

4. The majority of consumers patronize the selling dealer or other dealers for repairwork during the life of the warranty; however they often shift their patronage to other repair shops after expiration of the warranty.

5. The most important factor to consumers in selecting a repair shop is the trustworthiness of the mechanic or service representative.

6. Consumers believe that independent garages and shops and dealer repair shops have the greatest ability to provide the service attributes which they perceive as most important to satisfactory repair service.

7. The incidence of questionable practices was greater in Prince Georges County than in Travis County; the most common complaints are for unsatisfactory repairwork.

8. The major problem encountered by repair shops in providing quality repair service is the shortage of competent mechanics.

9. Consumers believe most repair shops to be slightly trustworthy and slightly careful in performing repairwork; repair shops share this view. Both groups view independent garages and shops as the most trustworthy and most careful repair shop category.

10. Consumers' and repair shops' evaluations of prices charged for repairwork ranged from slightly high to very high; they believe that dealer repair shops charge the highest prices for repairwork.

11. A wide disparity exists between consumers' attitudes toward the repair shop categories on the attributes of carefulness, prices and trustworthiness and how the repair shop categories view themselves on the same attributes; consumer attitudes are significantly less favorable.

12. Consumers favor passage of a repair shop licensing law and/or mechanics' licensing law at the state level. Repair shops also favor passage of these laws but not as heavily as consumers.

Major recommendations include expansion of present recruitment programs for mechanics: increased compensation and the establishment of a certification system for mechanics; simpler, more comprehensive warranties of longer duration; formation of grievance committees to handle consumer complaints; and, the establishment of a state repair shop registration system.

Order No. 73-18,741, 367 pages.

34: 468-A Aug '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Podvia (Last name), M. (First name), Wayne (Middle name)

Exact Title The Comparative Effects of Basic Education in Manpower Training.

Degree granted Ed. D., Date 1972, No. of pages in report 62

Granted by The Pennsylvania State University (Name of institution) University Park, Pennsylvania (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to determine the comparative effects of basic education in manpower training programs. Experimental comparisons were made between two randomly assigned groups. Two hypotheses specified that the mean Metropolitan Intermediate scores achieved by groups A and B at the conclusion of the training period are estimates of the same population mean in reading and arithmetic. Two hypotheses pointed out that mean training ratings, as measured by teacher evaluation on the MDTA rating scale, attained by groups A and B at the conclusion of the training period are estimates of the same population mean in achievement, and post training estimates. One hypothesis indicated that the mean attitude toward vocational instruction, as measured by the Attitude Inventory Scale, of groups A and B are estimates of the same population mean.

The sample consisted of 55 MDTA trainees enrolled in six occupational areas at the John F. Kennedy Skill Center. The trainees were referred to the center by the Bureau of Employment Security, Pennsylvania State Employment Service. Each trainee received the Philadelphia Reading Test, Grade 6, and the Philadelphia Test in Fundamentals of Arithmetic, Grade 6, upon entering the training program. The trainees were randomly assigned to one of the two groups. The experimental group A received basic education with occupational training and the control group B received occupational training only. At the conclusion of 160 hours of basic education instruction for group A, the Metropolitan Achievement Tests in reading and arithmetic computation were administered to the two groups. An MDTA rating scale was completed on each trainee by his vocational instructor at the completion of the training program. After each trainee completed his occupational instruction program he completed an Instruction Attitude Inventory.

The study was based upon the posttest control-group design. The .05 level was assigned as the statistical significant difference between groups. The t model was selected to examine possible differences between variables. Results of t test for testing the significances between the two independent means revealed that no differences existed between the two groups in regards to age and education level. The independent t test revealed that the treatment groups were similar with respect to entry level scores and the variances.

Findings from the MAT posttest scores showed that no differences existed between the two groups in reading or in arithmetic computation after group A had received 160 hours of basic education instruction. Results of an accumulated analysis of data for the 16 variables on the MDTA rating scale resulted in a t value which was not significant at the .05 level. The t test showed that the two groups were estimates of the same population mean in achievement and post training estimates. Analysis of data on the IAI resulted in a t value which was not significant at the .05 level. Neither group attained significant differences with regard to the variables on the mean attitude toward vocational instruction.

The main conclusion drawn from the findings in this research was that basic education made no significant difference in the outcome of trainees in the program. Achievement by the trainees in group A was no different than the achievement made by trainees in group B.

As a result of the findings which have been presented, other conclusions drawn from the study were:

1. The lack of difference between the groups may not have been because of the treatment (X) but rather because of characteristics of the trainees in the two groups. Aspects of internal validity, such as maturation, may have been a cause. The trainees had grown older, possibly more tired and more bored from the time they entered the program until they completed the program, thus the lack of difference was reflected. These effects may have been spontaneous as part of daily experience.

2. The trainees' attitude may have changed when they perceived that they were being used as objects for the attainment of certain outcomes. This observation may be evident, based on the characteristics of the trainees receiving basic education and the effect of being released from the occupational program, an area of training which they felt was more important than the treatment. Group B trainees may have been so determined to succeed that during the individual study time they put forth every effort to improve their ability. This is similar to the halo effect, whereby trainees try to outdo themselves.

Order No. 73-7472, 62 pages.

33: 5627-A April '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Poelzer (Last name), Irene (First name), Anna (Middle name)

Exact Title Gabriel Marcel's Views on Technology and Their Significance for Education

Degree granted Ph. D., Date 1972, No. of pages in report 208

Granted by University of Oregon (Name of institution) Eugene, Oregon (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study involved an examination of Gabriel Marcel's views regarding the general characteristics of technique, his ideas concerning the nature of dehumanization in a society pervaded by the influence of technology, and an exploration of how his ideas relate to present trends in education.

It was found that Gabriel Marcel, a contemporary French philosopher and playwright, understands technique to be self-generating procedures, rationally produced and transmitted, which ensure efficient production processes. He also sees modern technology as having the characteristics of the scientific world-view, functional values, emphasis on efficiency, organizational "giantism," and quantitative criteria for progress. Marcel sees technology to be thoroughly problematic in its approach to reality. He maintains that dehumanization stems from this technological attitude, and is apparent in technological society wherever man is reduced to a function. Chief among his concerns about technological society is what happens to human relationships, to man's image of himself, his inner freedom, and his attitudes towards knowledge, truth, and human progress, when man accepts, or is forced into, a functional way of life. Marcel contends that the objectification of man and his work diminishes growth of intersubjective relationships. Intersubjectivity which encompasses the relational, existential reality of fraternity, love, service, and community, nourishes the growth of the person. If the relational realities of man's life are ignored there is danger of man becoming dehumanized.

In the second part of the study, Marcel's ideas were utilized to explore aspects of education influenced by technology. The four areas of education which were examined included: mediated instruction, Jerome Bruner's theory of instruction, the systems approach to education, and school architecture. The purpose of this part of the dissertation was to disclose, through examination, the depersonalizing elements operative in education that are directly or indirectly related to the pervasiveness of technological values and processes in society today. This was done by 1) delineating basic structures, operations, and assumptions within each of the four areas, and 2) identifying the technological process and attitudes functioning in education which exert dehumanizing influence on teachers and students, and comparing that influence with the dehumanizing effects of technology which Marcel found in the larger society.

It was found that mediated instruction alienates a child from the discovery and development of his individual learning capacities. Since this instructional approach necessitates the intervention of a technological apparatus between the learner and his own learning process, it was shown that education is forced to take place according to a frame of reference which is designed for specific pre-determined results, and that it is prevented from emerging as the development of the child's unique perceptive and creative capacities. This alienation of the child from his own learning process prevents full personal development, and, in that sense, depersonalization occurs.

The problematic approach to instruction advocated by Jerome Bruner was shown to equip the student with a sense of objective consciousness that is geared to mastery and control rather than to the cultivation of ideas for personal and social enrichment. When the objective, scientific world-view is posited as most valuable and valid for successful living today, there is danger that the relational and spiritual realities of life which are necessary for personal growth will be ignored. It was also suggested that Bruner's theory of instruction is itself a technique which depends on precise motivational factors, and scientifically defined sequences of learning. Such an approach to instruction diminishes the possibilities for spontaneous personal response between teacher and student.

The systems approach which is basically a form of technical organization, dehumanizes teachers by depriving them of an over-all directiveness of their work as teachers, by fragmenting their work role through specialization, and by eliminating the opportunity to make educational decisions autonomously or on other than a technological basis. Teachers are reduced to the status of functional unity within the systems organization.

Finally, modern school architecture was found to influence students and teachers by the fundamental technological paradox which it reflects. This paradox is the possibility within technology for both freedom and unfreedom. The architectural concepts of open-space and flexibility reflect this paradox since they are designed to provide greater freedom for teachers and students, but at the same time they also generate feelings of "uprootedness," of dependence on external aids for intellectual development, and a sense of loss of community—all of which contribute to a fundamental unfreedom.

This study of the depersonalizing effects of technology in education does not fail to recognize the benefits of technology in education. Since these benefits are generally of practical, measureable significance, whereas technology's dehumanizing influence is not readily visible until it has reached alarming proportions, man tends to overlook the negative aspects of technology. This study has attempted to disclose some of these aspects.

Order No. 73-7946, 208 pages.

(33: 4693-A) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Polette, Douglas, Lee
(Last name) (First name) (Middle name)

Exact Title A Comparative Study of Teacher Education Institutions and Machine Tool Manufacturers to Determine Course Content for Machine Tool Maintenance Course in the Woodworking Area

Degree granted Ed. D., Date 1972, No. of pages in report 193

Granted by University of Northern Colorado Greeley, Colorado
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

The primary purpose of this study was to determine what type of maintenance training the prospective industrial arts teacher should receive in the woodworking area and under what type of instruction this information should be taught. The secondary purposes of the study were to: 1. Find how much agreement exists between industry and educators on matters pertaining to maintenance. 2. Determine the responsibility for maintenance in the woodworking laboratory. 3. Determine what portion of the budget is spent in maintaining equipment in the woodworking area. 4. Determine the condition of that equipment and if records are kept of maintenance performed on that equipment.

Procedures

A survey of literature from professional publications, related texts, literature from industry and research theses provided the material necessary to determine the background of maintenance instruction in the field. Using this information an instrument was constructed. Specific information on machine tool maintenance was gathered by the use of two questionnaires, one sent to industrial arts teacher educators and the other sent to manufacturers of power woodworking tools that are in use in the industrial arts facility.

An analysis of this data provided information for the recommendation of content in the area of power woodworking machine maintenance, methods of presenting maintenance information, maintenance responsibility, records, condition of equipment and maintenance budgets.

Findings

There was strong agreement between industry and educators that it is very important to provide the student with information which will allow him to determine if a machine is in safe operating condition. This would include knowledge in such areas as checking for proper grounding of a machine, proper adjustment of guards, etc. There was also agreement that those items that require special equipment and knowledge are not as important as items such as the adjustment and alignment of fences, tables, guides, etc. A disagreement was found to exist between industry and educators pertaining to those items dealing specifically with the sharpening of the cutting tool for each machine. In this case educators generally placed more importance on this item than did industry.

Teachers generally felt that the best method for presenting maintenance instruction to the student was to integrate this information into existing classes. A smaller percentage felt that the more technical items would be best presented in a special course specifically dealing with maintenance instruction.

The majority of educators agreed that maintenance instruction was a very important part of the total instruction that a future industrial arts instructor should be given. Most instructors rate their equipment as being in good to excellent condition and spend approximately 3 to 10 percent of their budget on maintenance activities. There was strong agreement indicating that the instructor should be responsible for maintenance of the equipment in his school shop facilities.

Conclusions

1. Items which are not of a highly technical nature but are required in terms of proper and safe operation are very important in maintenance instruction and should be taught as part of the operating instructions of that machine. 2. Technical maintenance items pertaining to major electrical repair, sharpening of the cutting tool, and major mechanical repairs should be taught in a specific maintenance course or workshop. 3. The ultimate responsibility for the proper maintenance of the equipment in an industrial arts woodworking laboratory is that of the instructor in that area. Therefore, it is extremely important for the future teacher of industrial arts to receive maintenance training. 4. Most schools spend an adequate amount on the maintenance of their equipment. Few schools, however, have all of their equipment in excellent working condition.

Order No. 73-303, 193 pages.

33: 3347-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Pontynen (Last name), Burton (First name), Ahlstrom (Middle name)

Exact Title An Evaluation of Noise Levels in College Welding Laboratories and its Effect on Student Hearing

Degree granted Ed. D., Date 1973, No. of pages in report 118

Granted by Arizona State University (Name of institution) Tempe, Arizona (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purposes of this study were (1) to determine what noise levels existed at selected student work stations in welding laboratories of community and senior colleges of Northern California, and (2) to determine if the noise level which existed at a selected welding laboratory had any effect upon the hearing acuity of the students participating in the class.

More specifically, the first part of the study was a descriptive study which reported on the noise produced when students performed the selected operations of arc welding, grinding, oxyacetylene cutting, chipping and cleaning welds.

The second part of the study was an experimental study which tested the following null hypotheses:

1. There is no significant difference in students' hearing acuity as measured by a pure tone audiometric test at the frequencies of 500, 1000, 2000 and 4000 hertz before and after practicing arc-welding skills in a welding laboratory for two and one-half hours.
2. There is no significant difference in students' hearing acuity as measured by a pure tone audiometric test at the frequencies of 500, 1000, 2000, and 4000 hertz after practicing arc-welding skills for two and one-half hours per day, twice a week, for a six-week period of time.

The experimental study utilized Campbell's and Stanley's Non-equivalent Control Group Design to compare the hearing acuity between an experimental group of welding students exposed to the noise of a welding laboratory with the hearing acuity of a control group of students who experienced the quieter environment of an art laboratory. The comparison was made by an analysis of variance using the t test at the five percent level of confidence.

An analysis of the combined effect of background noise and operation noise at work stations of the laboratories surveyed revealed that 37 percent had sound-pressure levels above 90 dBA slow response. The range of this noise was from 75 to 105 dBA slow response, and the mean was 88 dBA slow response.

The operations of arc welding and oxyacetylene cutting produced a mean computed operation noise level of 83 and 80 dBA slow response respectively; while the operations of chipping and cleaning welds, and of grinding produced a mean computed noise level of 90 and 96 dBA slow response resepctively.

For the experimental part of this study, the findings revealed that the first hypothesis was rejected. The experimental group pretest and posttest scores showed a temporary threshold shift in hearing acuity of 4.6 dB at the frequency of 4000 hertz.

The second hypothesis was not rejected. No permanent threshold shift in students' hearing acuity resulted from practicing arc welding skills for two and one-half hours per day, twice a week, for a six-week period of time.

With 37 percent of the work stations surveyed exposing students to sound-pressure levels above 90 dBA and with the experimental group of welding students experiencing a mean temporary threshold shift of 4.6 dB, it was concluded that some school welding laboratories are exposing students to ambient noise conditions which are of definite concern.

Therefore, the investigator recommended that serious efforts be taken by welding teachers, industrial educators and school administrators to reduce noise exposure to students in school welding laboratories.

It was further recommended that the curriculum of a school welding program include instruction related to the hazard of excessive noise exposure and ways to protect oneself from this exposure.

Recommendations were also made for additional research regarding additional knowledge on the effect of noise upon students taking welding classes and possible ways to reduce that noise. Order No. 73-18,209, 118 pages.

34: 597-A Aug '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Poulin (Last name), Donald (First name), Alphonse (Middle name)

Exact Title The Effects of Career Orientation on Vocational Interests and Occupational Plans

Degree granted Ph. D., Date 1972, No. of pages in report 121

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to ascertain the effects of a 15-week career orientation program on student vocational interests and occupational plans. In connection with this investigation, the major hypotheses tested were:

Hypothesis 1. There is no significant difference in vocational interests and occupational plans being strengthened or weakened—in terms of consistency with aptitudes—between an experimental group exposed to career orientation and a control group *not* exposed to career orientation.

Hypothesis 2. There is no significant relationship of sex, socio-economic status, intelligence, and language background to vocational interests and occupational plans being strengthened or weakened—in terms of consistency with aptitudes—as a result of career orientation.

Research Design and Treatment of the Data

The study was part of a NOW (New Opportunities for Work) Project, which is an exemplary, or pilot, program funded by the federal government in the Lewiston, Maine, School District. The treatment groups, experimental and control, were selected from two junior high schools located in the twin cities of Lewiston and Auburn. Only the experimental group was exposed to career orientation. Ninth grade students at both schools were randomly selected.

The Ohio Vocational Interest Survey (OVIS) identified both vocational interests and occupational plans, while the General Aptitude Test Battery (GATB) measured aptitudes. Both the OVIS and GATB were given as pretests to both groups. Upon completion of the 15-week career orientation program, both groups were posttested. This was done in order to determine if vocational interests and occupational plans were strengthened or more consistent with aptitudes as a result of career orientation. This determination was made by comparing the experimental group with the control group.

As part of the career orientation, the experimental group met for three periods per week for the 15 weeks. The curriculum content of the program was developed to parallel the 1965 edition of the *Dictionary of Occupational Titles* (DOT). The curriculum activities were also geared to achieve the major program objective of orienting students to the wide range of opportunities available in the world of work. The major portion of the subject matter for the career orientation program was presented by NOW personnel or members of the pupil personnel service group.

In analyzing the data, each student's pretest and posttest scores were compared with each other to determine if his vocational interests and occupational plans were strengthened or more consistent with his aptitudes. If the student's vocational interests and occupational plans were more consistent with his aptitudes, this was considered a "strengthened change." If they remained the same, this was termed "no change." Finally, if they were less consistent with aptitudes, it was termed a "weakened change." Every student was evaluated in terms of either a "strengthened change," "no change," or "weakened change." Evaluations were processed using the chi square test for significance.

Results

Hypothesis 1 was rejected at the .02 level for vocational interests, and at the .01 level for occupational plans. However, in both cases, the significance was in the opposite direction from that which was expected. That is, there were more students who experienced "weakened changes" than "strengthened changes."

Hypothesis 2 was accepted at the .05 level for both vocational interests and occupational plans.

Conclusions

On the basis of what was found in this experiment, student vocational interests and occupational plans were not strengthened or more consistent with aptitudes as a result of career orientation. Furthermore, the characteristics, sex, socioeconomic status, intelligence, and language background were not found to be significantly related to vocational interests and occupational plans being positively altered or more consistent with aptitudes after career orientation.

Findings of the study are inconclusive in that they do not explain why students in the experimental group expressed greater numbers of "weakened changes" than "strengthened changes," nor is the meaning of these changes known.

Order No. 72-32,190, 121 pages.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Prewitt, Roger, Wayne
(Last name) (First name) (Middle name)

Exact Title An investigation of the Effectiveness of Four-Year Industrial Technology Programs in Preparing Industrial Electronic Technicians to Meet the Requirements of Industry.

Degree granted Ed. D., Date 1973 No. of pages in report 158

Granted by University of Northern Colorado Greeley, Colorado
(Name of institution) (City, State)

Where Available: Microfilm ( ) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To determine the effectiveness of the four-year industrial technology programs in preparing electronic technicians for employment in industry. The technician's preparation in electronics was not examined because of previous research findings which were available.

Source of data and method of study: Data for this study were gathered through the use of a validated opinionaire which was sent to those institutions offering four-year industrial electronic technician programs as well as to representatives from industry. The respondents were asked to make a series of value judgements concerning statements dealing with skills and knowledge the technician should exhibit.

Findings and Conclusions: The industrial technology programs which were questioned proved to be very effective in preparing electronic technicians to meet the requirements of industry. The following conclusions were drawn as a result of this study:

1. Both the educators and industrial representatives generally agreed concerning the skills and knowledge areas this technician should possess.
2. This technician was not being over-trained.
3. Feedback from both education and industry could be acquired regularly and a system developed to keep technical education curriculum continually up-dated.
4. The need for the four-year industrial electronic technician should remain steady or increase through 1983.
5. The present curriculum followed by this technician did not cause him to become one who could use basic woodworking hand tools.
6. There were more two-year technicians presently employed by industry than four-year technicians.
7. Education was more strongly opinionated than industry.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Price, Robert, Gregg.
(Last name) (First name) (Middle name)

Exact Title The Use of Manpower Needs and Student Interest to Plan Vocational and Technical Programs in Kansas

Degree granted Ph. D., Date 1973, No. of pages in report 102

Granted by Kansas State University Manhattan, Kansas
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The Vocational Education Amendments of 1968 require that vocational and technical education programs prepare students for job opportunities and that student interest be considered when planning vocational offerings. Kansas does not have a policy which dictates the mix of student interest and manpower needs necessary for the establishment of a vocational or technical program.

The first objective of the study was to determine if manpower needs and student interest were compatible criteria on which to base vocational and technical programs.

The second objective was to determine if manpower needs, student interest or a combination of these two criteria was used for planning vocational and technical programs in Kansas.

Sample data was acquired for manpower needs, student interest and program enrollment. Manpower needs data was taken from the 1973 K-MUST report; student interest data was gathered by the K-VIEW system; and program enrollment data was provided by the Kansas State Department of Education.

The data was analyzed and a significant positive correlation between manpower needs and student interest was identified. This correlation indicated that student interest and manpower needs were compatible criteria for planning.

A composite rank for student interest and manpower needs was calculated and compared with program enrollment data. A significant positive correlation was determined between the composite criteria and program enrollment. This indicates that manpower needs and student interest have been utilized in vocational and technical education planning in the past.

A further analysis was conducted with compared student interest and program enrollment, and manpower needs and program enrollment. Both student interest and manpower needs were found to have a significant positive correlation with program enrollment, however, the student interest correlation was much greater than the manpower needs correlation. This indicates that more emphasis was placed on student interest than on manpower needs in the planning process.

This study should have a significant impact on the planning of vocational and technical education. Planners should become more aware of the part both manpower needs and student interest play in the planning process. An increased effort should be made to establish weighting policies concerning the mix of manpower needs and student interest for vocational and technical program planning purposes. Attempts should be made to identify other factors which affect vocational and technical planning.

Order No. 73-26,364, 102 pages.

34: 2478-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Quinones (Last name), Louis (First name), Edward (Middle name)

Exact Title The Pressure Treatment Industry: Current Practices and Future Outlook

Degree granted Ed. D., Date 1973, No. of pages in report 218

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to survey the pressure-treatment industry in order to determine (1) the current processes utilized in the impregnation and preservation of wood and wood products; (2) the chemicals and chemical solutions employed in the preservation and modification of wood and wood products; (3) the properties which the various impregnation processes affect upon these products; (4) the major commodities in the commercial market which are pressure-treated; (5) the relationship which exists commercially between the commodities identified; (6) the production record of the pressure-treatment industry during the period 1949 through 1970; and (7) the consumption rates and utilization patterns of the chemicals as they have been established through consumer demand.

The primary sources of technical information and statistical data were found to be: (1) Standards, an American Wood Preserver's Association publication; (2) Proceedings, an American Wood Preserver's Association annual publication; (3) Wood Preserving, an American Wood Preserver's Association monthly publication; (4) consultants in the industry; (5) observation through visitation of pilot research plants in the industry (6) research papers prepared either at Forest Products Laboratories, Madison, Wisconsin, or under their supervision or direction; (7) wood preservation texts; and (8) commercially prepared data or promotional brochures.

The data gathered were representative of the entire pressure-treatment industry within the United States, and were the product of the combined efforts of the United States Department of Agriculture, Forest Service, Forest Products Division and the American Wood Preserver's Association. These data have been interpreted by the author and presented in a comprehensive and more descriptive form in order to relate the activity generated by the 395 treatment plants which are currently in operation within the United States.

The survey disclosed that the number of treating plants has increased by 116 since 1949 to a total of 395 operating in 1970. The data indicate an overall loss in production volume during the period of the study, but an analysis of the production patterns and market demands for the types of commodities being treated reveals that there is less production of the high volume (cubic foot measure) single items, exampled by railroad ties and utility poles, and a phenomenal increase in the production of smaller items which are more commonly in direct contact with the general public: fire-retardant treated paneling, which is used extensively in public buildings, and most recently, a nonleachable fire-retardant treated cedar shake shingle. The study also reveals a strong trend away from those preservative treatments which leave an unclean surface (as is exampled by the creosote and coal tar treated materials), toward the water-borne and liquid petroleum gas-borne preservatives which would allow for applications where the commodity may be placed in direct contact with the public and must be clean to the touch, or have characteristics which will allow for painting or otherwise surface treating the material for aesthetic reasons.

The research brought forth the fact that there is a remaining body of information, of both statistical and technological nature, which is proprietary to the individual manufacturers. This information deals with the formulations, impregnation, and curing of wood and wood products treated with plastic solutions. Because of the intense competition in the production of superior products of this nature, the information is currently unavailable and, therefore, this survey is unavoidably incomplete.

Order No. 73-13,158, 218 pages.

33: 6708-A June '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Rehorn, Glen, Ewell
(Last name) (First name) (Middle name)

Exact Title The Influence of Industrial Arts Experience on the Vocational Knowledge of Students in the Area-Vocational Schools in Oklahoma

Degree granted Ed. D., Date 1972, No. of pages in report 159

Granted by Oklahoma State University Stillwater, Oklahoma
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

SCOPE AND METHOD OF STUDY: This study involved juniors and seniors enrolled in automechanics, carpentry, and machine shop in the area vocational schools. The students were concurrently enrolled in high schools within the district which an area school served. There were 372 automechanics students, 154 carpentry students, and 234 machine shop students utilized in the study.

The first purpose of the study was to ascertain the influence of various amounts of related, unrelated, or related plus unrelated industrial arts on the vocational knowledge of junior and senior vocational students in automechanics, carpentry, and machine shop. Students were given a multiple choice test on the subject in which they were enrolled at the area vocational school. Data concerning each student were gathered from high schools that permitted categorizing students as to junior or senior students in automechanics, carpentry, or machine shop. The data gathered also permitted grouping students within categories based on the number of semesters of industrial arts experience: 0, 1-2, 3-4, 5-6. The students' scores were placed within the proper group and category based on the student's vocational subject, class (junior or senior), amount and type of industrial arts (related, unrelated, or related plus unrelated). The scores within the groups were the dependent variables used in the analysis of variance.

The second purpose was to ascertain the: (1) linear relationship between group mean scores and numbers of semesters of industrial arts, (2) linear relationships between numbers of semesters of industrial arts and industrial arts grade point averages, (3) correlation between test scores and industrial arts grade point averages within each group. The group mean score, industrial arts grade point averages per group and numbers of semesters of industrial arts collected in the data were used to establish the previously described relationships.

FINDINGS AND CONCLUSIONS: Eighteen null hypotheses were tested and accepted indicating no significant difference in vocational knowledge due to various amounts and types of industrial arts. Eighteen null hypotheses were tested to ascertain the linear relationship between group mean scores and numbers of semesters of industrial arts. Eight were rejected, nine were accepted, and sufficient data were not available to base acceptance or rejection of one null hypothesis. Eighteen null hypotheses were tested to ascertain the linear relationships between industrial arts grade point averages and the numbers of semesters of industrial arts. Three were rejected, ten were accepted, and sufficient data were not available upon which to base acceptance or rejection of five null hypotheses. Correlation coefficients were calculated between test scores and industrial arts grade point averages of students within thirty-seven groups. Seventeen correlations were significantly positive, twelve were positive but not significantly, and eight were negative.

It was concluded that: (1) various amounts and types of industrial arts did not significantly contribute to a greater vocational knowledge of automechanics, carpentry, or machine shop as exhibited by scores on a trade proficiency test; (2) there was not a sufficient majority of null hypotheses rejected relative to relationships between test scores, numbers of semesters of industrial arts, and industrial arts grade point averages to base any generalization to the population used in this study; (3) industrial arts grade point average was the variable most closely related to scores on the trade proficiency test.

Based on the findings and conclusions, the following recommendations were made: (1) if a secondary role of industrial arts is to serve effectively as prevocational education, the industrial arts curriculum should consist of courses directly related to the vocational subjects offered in the area vocational school within a particular district; (2) the content of the courses directly related to the vocational subjects should include lectures and activities that will contribute to career orientation and exploration objectives of industrial arts as it contributes to the prevocational effectiveness of industrial arts; (3) if the personnel concerned do not wish to implement these recommendations or similar recommendations that will achieve the same objectives, the secondary role of industrial arts as prevocational education should be abandoned.

Order No. 73-15,220, 159 pages.
33: 6708-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Reid (Last name), Richard (First name), Alma (Middle name)

Exact Title Guidelines for Evaluation Activities Conducted by State Advisory Councils for Vocational and Technical Education

Degree granted Ph. D., Date 1972, No. of pages in report 194

Granted by The Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to develop guidelines to be used by state advisory councils in performing their evaluation role. The specific objectives of the study which provided support to the major problem were: (1) to determine administrative relationship between state advisory councils and state boards for vocational education and state directors of vocational education; (2) to identify the evaluation role as perceived by state advisory councils; (3) to identify the evaluation activities of state councils in evaluating vocational programs and the state plan for vocational education: (4) to identify and assess the evaluation plans used by state advisory councils; (5) to identify criteria used by state councils in evaluating vocational programs and state plans for vocational education; (6) to determine the extent to which advisory councils are publishing and distributing evaluation results and other information; and (7) to identify the persons or agencies responsible for conducting and interpreting state council evaluation studies.

The state director of vocational education, the state advisory council chairman, and advisory council executive director in each of the fifty states, Puerto Rico, and the District of Columbia were asked to respond to mailed questionnaires. Independent questionnaires designed to collect data from the three population segments resulted in an eighty-five percent response.

The findings showed that thirty-seven states had advisory councils prior to the Vocational Amendment of 1968. After the Amendment of 1968 mandated a new and separate council, ninety-four percent of the states complied by the end of 1969. State directors were in attendance at most state advisory council meetings on invitation. The council perceived their evaluation role to be statewide in nature, representing the public as consumers of vocational education. Seventy-seven percent of the councils had evaluation committees. Two-thirds of the councils had written evaluation plans covering one year, but only one-fourth had a two-five year plan. The councils reported data, money, people, and time as being their major problems encountered in evaluation. Most evaluations were conducted by the councils themselves and the state department of vocational education provided the council with much of their information. Twenty-eight percent of the councils had developed their own evaluation plan.

The following conclusions were finalized from the study: (1) a large majority of the councils had developed a satisfactory relationship with the state boards and state departments of vocational education; (2) the councils perceived their role as representing the general public in assessing the effectiveness and accessability of all types of public vocational education; (3) the councils' evaluation activities included the holding of public hearings, reviewing all available evaluation studies, contracting for additional studies when needed, and developing recommendations for the improvement of vocational education programs; (4) the councils were using unsophisticated evaluation models; (5) most councils were developing their own individual plan for evaluation; (6) student placement and program availability were major evaluation criteria; (7) the councils were disseminating their evaluation findings to vocational educators and the general public through council publications, primarily their annual report; (8) councils were performing a good share of their own evaluations supplemented by contracted evaluations and information provided by the state departments of vocational education.

The guidelines developed and suggested for adoption by most councils in performance of their evaluation role include such issues as: (1) the improvement of vocational education; (2) the evaluation of state plans; (3) checking for the implementation of vocational acts; (4) advisory councils as independent evaluators; (5) development of council staffs knowledgeable in evaluation; (6) the development of a formal evaluation plan by council; (7) establishment of evaluation criteria; (8) providing opportunities for councils to discuss and exchange ideas on evaluation procedures; (9) utilization of council members expertise; (10) development and use of evaluation systems; (11) securing contractual evaluation services; (12) the utilization of related evaluation studies; (13) cooperative evaluation efforts; (14) collection of data for evaluation; (15) submission of recommendations which are measureable; (16) recommendations concerning all vocational education; and (17) publication and distribution of evaluation findings.

Recommendations are that councils: (1) adopt the guidelines of this study; (2) contract for services of professional evaluators; (3) develop and adopt acceptable formats for reporting evaluations; (4) publish and distribute evaluation findings to decision-makers whose leadership influences vocational education; (5) strive for state funding to supplement federal funds; and (6) strive to improve the relationship for acceptance and appreciation with state department of vocational education.

Order No. 72-27,088, 194 pages.

33: 1607-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Richards (Last name), Freddie (First name), Louis (Middle name)

Exact Title Effects of Performance Objectives on Electrical Skill Learning of Educationally Disadvantaged Students

Degree granted Ph. D., Date 1972, No. of pages in report 120

Granted by The Pennsylvania State University (Name of institution) University Park, Pennsylvania (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The first purpose of this multivariate investigation was to evaluate effects of two instructional units used to teach students electrical knowledge and skills. The second purpose was to evaluate the effect of three methods of inservice teacher education on student learning of electrical knowledge and skills and the possible interaction of the instructional units and the inservice teacher education methods. A major purpose of this investigation was to evaluate the effect of the instructional units on educationally disadvantaged and not educationally disadvantaged student learning of electrical knowledge and skills. The outcomes were tested by a thirty-question multiple choice achievement test of electrical knowledge and by the grade each student received for performance of electrical skills.

The two instructional units were known as a skill unit and a theory unit. The skill unit, "Electrical Wiring Skill Sheets," was developed by the investigator. It contained two jobs and twenty-seven skills. The theory unit, "Basic Electricity and Practical Wiring Lessons," was developed by a professor and a graduate assistant in the Agricultural Education Department at The Pennsylvania State University.

A pamphlet, "Outline of Methods for Teaching the Educationally Disadvantaged Student," was prepared by the investigator for use in inservice teacher education. The inservice education methods were: Group 1, no formalized treatment; Group 2, mailed pamphlet; and Group 3, delivered pamphlet and discussed its contents. The students were classified as educationally disadvantaged or not educationally disadvantaged by high school fifths. Students in the 4th and 5th fifths of their high school class were classified as being educationally disadvantaged. Students in the 1st, 2nd, and 3rd fifth were classified as not educationally disadvantaged.

Eighteen teachers and their students were randomly assigned to the experimental treatment groups. Nine teachers and their students received the skill unit. The teachers who received the skill unit were randomly assigned to each of the inservice education methods with three teachers assigned to each method. The nine teachers who received the theory unit were randomly assigned to each of the inservice education methods with three teachers assigned to each method. There were six teachers who received each inservice education method.

The two dependent variables used in the investigation were the posttest of electrical knowledge and the grade received for performance of electrical skills. The classification variables used in the covariance analysis of electrical knowledge were the pretest and agricultural class fifth. The classification variables for grade received for performance of electrical skills were the knowledge pretest and high school fifth. Student reading level by grade and the pretest were used as the classification variables for testing the effect of the instructional units on educationally disadvantaged and not educationally disadvantaged student grade received for performance of electrical skills.

Students who studied the skill unit made higher scores on the achievement test compared to the students who studied the theory unit. The students who studied the skill unit had better grades for performance of electrical skills compared to the students who studied the theory unit.

There was no significant difference in effect attributed to the inservice teacher education methods on the achievement test scores. Students whose teachers received their inservice education material through the mail made better grades for performance of electrical skills.

There was no significant interaction of the two instructional materials by the three inservice education methods on the achievement test scores and grades received for performance of electrical skills.

The educationally disadvantaged students who studied the skill unit had higher scores on the achievement test and received higher grades for performance of electrical skill than the educationally disadvantaged students who studied the theory unit. There were no differences in the scores of the following groups of students: the educationally disadvantaged students who studied the skill unit, and the not educationally disadvantaged students who studied the skill unit, and the not educationally disadvantaged students who studied the theory unit. The educationally disadvantaged students who studied the theory unit had lower mean scores on both tests.

Order No. 73-21,276, 120 pages.

34: 1167-A Sept '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Richards, Thomas, Arthur
(Last name) (First name) (Middle name)

Exact Title A Study of the Appeal of Color Photographic Prints Containing Five Independent Variables

Degree granted Ph. D., Date 1972, No. of pages in report 212

Granted by Syracuse University Syracuse, New York
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Teachers, photographers, and designers of visual messages must constantly consider the basic question, "What response will certain populations make to controlled stimuli?" Professional communicators who use photography are clearly limited by the available scientific research about the medium.

This study used fifty-four 8" x 10" color "C" photographic prints to elicit responses; the general content of these photographs was a female model in natural environments void of man-made objects.

The photographic scheme and testing procedure allowed for bilatitudinal extremes of five independent photographic variables to be sublimated within the photographs. The independent variables were: (1) lighting, (2) environment, (3) color of attire, (4) poses, and (5) objective/subjective camera treatments.

Two student populations (photography and forestry) were selected for the testing because of their intimate association with the design element. Photography students were selected because of their role as potential "producers" of visual messages, and forestry students were selected because of their expressed interest in natural environments.

Chi-square analyses (.95 level of probability) were used to determine significant differences of the test populations to the controlled stimuli.

The forestry population revealed a strong preference for the white leotard over the black leotard, and for lying poses over standing poses. The foresters preferred the hardwood over both the softwood and open-field environments. They did not indicate a preference for two of the independent variables: lighting, and objective/subjective camera treatment.

Like the foresters, the photography population also preferred the lying poses over the standing poses. However, the photographers rated the open-field environment higher than both the hardwoods and softwoods. The photography students did not indicate a preference for either the color of attire, or the objective/subjective camera treatment.

A further test of all the response data from the photography population indicated a significant difference between the responses of men and women.

The test design, methodology, and method of statistical analyses for this investigation proved to be efficient, applicable and valid. It is therefore recommended for future studies of visual perception investigating the same or similar elements.

Order No. 73-7765, 212 pages.

(33: 4694-A) March '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Richardson, William, Bert
(Last name) (First name) (Middle name)

Exact Title Cost-Benefit Analysis of Vocational-Technical Education Programs in Missouri Junior Colleges

Degree granted Ph. D., Date 1972, No. of pages in report 212

Granted by University of Missouri Columbia, Missouri
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Objectives of the Study

The major purposes of this study were: (1) to ascertain the per student cost of two-years of junior college vocational-technical education, (2) to determine the economic benefits of the students who had completed these vocational-technical programs, and (3) to determine the cost-benefit relationships of the vocational programs based on three investment criteria.

Methods and Data Source

The task undertaken in conducting this study were: (1) to solicit the cooperation of the junior colleges in Missouri, (2) identify the vocational-technical programs being offered by these junior colleges, (3) collect and analyze the cost of operating these programs, (4) follow-up the individuals who had completed these programs to determine the benefits attributable to junior college vocational-technical schooling, and (5) analyze the cost and benefits of each of the vocational programs by use of selected investment criteria.

Eight junior college districts in Missouri cooperated in the study. Cost data were estimated on seven vocational program areas being operated by these junior college districts. These program areas were (1) Agricultural Business and Industry, (2) Business and Office Occupations, (3) Data Processing and Computer Science, (4) Distributive Education, (5) Health Occupations, (6) Public Service Related Occupations, and (7) Trade and Industrial Occupations.

The cost data were summarized and average annual costs per program area calculated. The average annual costs were doubled to arrive at a two-year added cost of operating a junior college vocational program. Monthly earnings were obtained from individuals who had completed programs during the fiscal years of 1968-69, 1969-70, and 1970-71. There were 289 usable responses from mailed questionnaires. Benefits accruing to students completing junior college education programs were determined by subtracting earnings of high school graduates from earnings of junior college graduates. Three levels of earnings of high school graduates who did not attend junior college were forecast. Multiple regression techniques were used to control for other graduate characteristics that influence earnings so as to provide an estimate of the net benefits that could be attributable to junior college vocational training. Net benefits were projected forward over the expected lifetime of graduates and discounted to the present. Investment criteria were then applied to determine the feasibility of outlays of funds for vocational education at the junior college level.

Results and Conclusions

Costs among program areas ranged from $1108 to $3608 for Public Service Related Occupations and Health Occupations respectively. The weighted average cost for all programs was $1822.

Annual benefits, earnings minus earnings of high school graduates ($5,000), accruing to students completing vocational education programs ranged from $320 to $4,360 for Agribusiness and Public Service Related Occupations respectively. The benefits, among all schools and program areas (weighted average), were $1,886.

Application of investment techniques showed all programs as favorable investments. Benefit-cost ratios ranged from 2.5 to 57.4. Rates of return to educational outlays (internal rates of return) ranged from 20 to well over 50 per cent.

The major conclusions of the study were:

1. A standardized method of cost accounting should be developed and implemented by the junior colleges to aid in recording and analyzing the costs of the programs being operated by the junior colleges.
2. Vocational departments should strive to maintain up-to-date files and follow-up information on all individuals who have left the junior college vocational programs, either by graduation or for other reasons.
3. A standardized method of reporting vocational student enrollments should be developed by the Vocational Division and the Junior College Division of the Missouri State Department of Education.
4. Junior college program planners should broaden their perspective of vocational program evaluation to include both costs and benefits of vocational training in addition to the more traditional process evaluation. Scrutiny of cost data only, for decision making purposes, provides different results in terms of "investment favorability" ranking among program areas.

This study provides the administrators of vocational educational monies information and techniques necessary for decision making with respect to the optimum allocation of scarce educational resources among competing program areas. Likewise, this study provides the administrators, at all administrative levels, with information and techniques of analyses that would provide the basis of program and curriculum improvement.

Order No. 73-21,477, 212 pages.

34: 1187-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Rigby (Last name), William (First name), Henry (Middle name)

Exact Title Monolithic Integrated Circuits: Implications for Industrial Education

Degree granted Ed. D., Date 1972, No. of pages in report 194

Granted by University of Northern Colorado (Name of institution) Greeley, Colorado (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

The purpose of this study was twofold: first, to identify those instructional topics related to integrated circuits which are appropriate for inclusion in industrial education classes: second, to prepare an instructional monograph on integrated circuits which can be used in an industrial education electricity/electronics class.

Procedures

A response form was sent to four employment titles in each of twenty-five integrated circuit manufacturers for the purpose of their recommending integrated circuit topics for industrial education electricity electronics classes.

Based on these recommended topics, an instructional monograph was developed which can be used in secondary and college level industrial education classes.

Findings

Integrated circuits account for a significant portion of the solid state electronics sales market and because of their popularity and wide use deserve inclusion in industrial education electricity/electronics classes. In 1970 integrated circuits accounted for more dollar volume sales than all solid state devices including transistors.

Of the 55 instructional topics submitted to IC manufacturers for their recommendation, 8 (14 per cent) were recommended as highly desirable, 32 (58 per cent) were recommended as moderately desirable, and 15 (27 per cent) were recommended as desirable for inclusion in an industrial education electricity/electronics class.

A comparison of the 55 recommended instructional topics with those listed in a previous study revealed five new topics that were rated very highly by the respondents to this study. These additional topics center around the developing field of solid state memories and laboratory activities using linear, digital, and memory IC's.

The development of an instructional monograph on integrated circuits for use in industrial education classes was also a major development of this study.

Conclusions

1. Integrated circuits command a significant portion of the field of electronics and, therefore, should be included in industrial education programs at both the secondary and college level. 2. Based on manufacturers' recommendations the following instructional topic clusters should be included in an industrial education course dealing with IC s: Development and Impact of Integrated Circuits, Basic Semiconductor Theory, Introduction to Monolithic Integrated Circuits, Linear Integrated Circuits, Digital Integrated Circuits, Memory Integrated Circuits, Future Capabilities and Applications of Integrated circuits. 3. Instructional materials, such as the monograph in this study, can and should be developed with the aid of industry for use in industrial education. Order No. 73-308, 194 pages.

33: 3347-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Riley (Last name), John (First name), N. (Middle name)

Exact Title Testing the Value of Silent Super 8MM Single Concept Loop Films As An Aid to the Acquisition of Manipulative Skills in the Machine Trades

Degree granted Ed. D., **Date** 1972, **No. of pages in report** 112

Granted by Rutgers University (Name of institution) New Brunswick, New Jersey (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to empirically measure silent super 8mm single concept loop films as an aid to learning manipulative skills in a machine shop setting. This study adds research in the area of (1) the more natural setting of combining the lecture-demonstration with the individual use of loop films during the repetition and reinforcement periods of learning, and (2) testing to see if manipulative skill acquisition in terms of machine skills through the use of loop films is similar to the acquisition of purely hand skills.

Seventy-nine first year marine engineering college students were randomly divided into control and experimental groups. The control group received standard lecture-demonstration instruction on the orientation and safe operation of an engine lathe and the use of a micrometer. Specific lathe functions were facing and turning to size using the micrometer dials, tailstock spotting and drilling, knurling, compound rest taper turning, and parting of work held in a three-jaw universal chuck. The experimental group received identical teacher performed lecture-demonstration instruction with the addition of the loop films being shown during and following the lecture-demonstration period and free access to loop films during the repetition-reinforcement period of learning.

The study consisted of nine to ten hours of instruction on consecutive days, and a two-hour performance exam at the close of the second day.

Two research hypotheses were tested and analyzed using a t test. (H_1) There will be a significant difference in favor of the manipulative skill acquisition of students receiving lecture-demonstration plus film instruction compared with lecture-demonstration only instruction as measured by acceptable units produced, and (H_2) there will be a significant difference in favor of lecture-demonstration plus film instruction as compared with lecture-demonstration only instruction as measured by demands made upon teacher time.

The comparison of t values for the treatments in terms of units produced were not significant and thus research hypothesis 1 was rejected. Data concerning teacher dependence favored the teacher plus film treatment and was significant at the .05 level and thus an acceptance of research hypothesis 2.

Subjective data obtained from teacher observation and student questionnaires provided many positive comments concerning the silent films. Sample student comments are as follows:

"I was amazed how much I got out of those films."

"The SC films were a great idea for when we got stuck on questions or a certain procedure."

"This is a real good idea. (SCF) saves time for the instructor and lets us stop asking minor questions."

"I pay better attention to a silent film."

"Short films were excellent."

The instructors indicated upon observation of the classes that students having access to films showed a marked degree of confidence at the machine tools. It was noted that their questions were more knowledgeable, thus requiring short answers rather than a reconstruction of the demonstration. This observation compares favorably with the data concerning teacher dependency.

Comparing the acquisition of machine skills versus hand skills, it can be said that in terms of production the loop film contributions to the teaching-learning situation are similar but not equal. In terms of teacher dependency, both hand and machine skill teaching-learning situations benefit significantly from the addition of loop films.

It is concluded that the loop films contribute to the learning situation, particularly in the area of teacher dependency. The data both objectively and subjectively support the loop films as a teaching aid, thereby relieving the teacher for closer supervision and course enrichment activities.

Order No. 72-26,793, 112 pages.

33: 1607-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Rivell (Last name), Amos (First name), Clift (Middle name)

Exact Title The Relationships of the Administrative Setting and Certification Level on Selected Performances Needed by Trade and Industrial Teachers

Degree granted Ed. D., Date 1973, No. of pages in report 153

Granted by The Florida State University (Name of institution) Tallahassee, Florida (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

A study of the relationships of administrative setting and certificate level upon trade and industrial teacher perceptions of their competence and their reported frequency of use of selected performances required of them was carried out within the geographical area of Eastern Pennsylvania. Administrative setting was divided into three levels: (1) self-contained vocational schools, (2) vocational centers, and (3) comprehensive high schools. Three certificate levels were used: (1) less than a Vocational Instructional I (less than eighteen semester hours of the approved industrial teacher education program completed), (2) Vocational Instructional I (eighteen to fifty-nine semester hours of the approved program completed), and (3) Vocational Instructional II (sixty or more semester hours completed).

An original questionnaire was constructed from the "Teaching Career Analysis" developed at The Center for Vocational and Technical Education, Ohio State University. Items for the questionnaire were selected from this analysis by a jury of experienced teachers. Five-point self-rating scales for each of the items selected were used. Ratings of the amount of difficulty experienced by teachers were used as an indication of competence. The scale for competence had provision for teachers to rate each item on one of five levels from "have no difficulty" to "have great difficulty." Another part of the questionnaire allowed each item to be rated in terms of frequency of use--"never, yearly, monthly, weekly, daily." Reliability of the questionnaire was established by administering it to a representative group of forty-six trade and industrial teachers. The Alpha coefficient of reliability was .94.

The questionnaire was then administered to a sample of one hundred fifty teachers. The sample was composed of three groups of fifty teachers randomly selected from each of the three administrative settings.

The ratings of teacher perceptions of competence and ratings of teacher reported frequency of use thus obtained were analyzed for each of the nine performance categories listed in the Teaching Career Analysis. These categories are: (1) Program Planning, Development and Evaluation, (2) Instruction-Planning; (3) Instruction-Execution; (4) Instruction-Evaluation; (5) Management; (6) Guidance; (7) School-Community Relations; (8) Student Vocational Organization; (9) Professional Role and Development. The method of analysis was multivariate analysis of variance. The design consisted of three levels of administrative settings and three certificate levels.

Eighteen multivariate analyses of variance were computed: nine multivariate analyses of variance (one for each category) for teacher perceptions of competence, and nine multivariate analyses of variance for teacher's reported frequence of use. The clusters of performance elements in each category were treated as the multivariates in each design.

The null hypotheses were rejected because significant statistical differences were found in six performance categories: four due to the administrative settings; three due to the certificate levels. The conclusions were: The administrative settings in which trade and industrial teachers teach are related to their perceptions of their competence in performances and their reported frequency of use of performances. The certificate levels of trade and industrial teachers are related to their perceptions of competence in performances and their reported frequency of use of performances.

Recommendations for further research include studies to determine the effects of administrative settings on job placement and retention of students enrolled in trade and industrial classes, and the effects of the certificate level of the teacher on job placement and retention of students enrolled in trade and industrial classes. Order No. 73-18,314, 153 pages.

34: 680-A Aug '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Rogan, William, Boyd
(Last name) (First name) (Middle name)

Exact Title An Evaluation of Local Vocational Advisory Councils in Michigan

Degree granted Ed. D., Date 1973, No. of pages in report 134

Granted by Western Michigan University Kalamazoo, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to evaluate local vocational advisory councils in Michigan. The evaluation was primarily based on the perceived function of councils by superintendents, vocational education directors, and local council members. Two other factors included in the evaluation were organizational characteristics of councils and personal characteristics of council members.

The study was conducted by mail questionnaire. Twenty-four school districts were represented in the study. The recipients of the questionnaire were 24 superintendents, 24 vocational directors and 444 local council members from the 24 school districts.

Analysis of the data was done by the computation of mean scores, correlation coefficients, and the use of the one-way analysis of variance models. Part I of the questionnaire concerned biographical information on council members. Part II of the questionnaire was answered by directors only and provided information concerning the organizational characteristics of the councils. Each of the 20 council functions which appears in Part III of the questionnaire, were analyzed separately. Respondents were asked to indicate the present condition and preferred condition for each of the twenty functions.

There were three variables used in the study. The first variable was type of respondents which included superintendents, vocational education directors, and local council members. The second variable was community size. Five community classifications were used. The third variable was type of council which included craft councils and general councils.

Findings in the study indicated that the greatest differences in perceived functions exist between the three types of respondents and little variance could be attributed to council type of size of community. Findings also indicated that councils consist primarily of white, middle-aged males and that councils vary greatly in their organizational patterns.

The functions which were considered to be present to the greatest degree and most preferred by all respondents were item 10 (formulation of recommendations) and 1 (total vocational needs of the district). Those functions which were perceived as present to the least degree and least preferred by all respondents were items 18 (recruitment and selection of teachers) and 20 (recommendations on program budgets).

Order No. 73-19,637, 134 pages.

34: 1187-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Rothenberg (Last name), Harvey (First name), David (Middle name)

Exact Title Attitudes Toward Vocational Education

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 254

Granted by Colorado State University (Name of institution) Ft. Collins, Colo. (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was (1) to determine if relationships exist between attitudes toward vocational education and interest or participation in vocational education programs, and (2) to determine attitudes relative to the present vocational education program which would be helpful in future curriculum planning for vocational education.

An attitude scale questionnaire that measured attitudes toward vocational education was constructed and utilized along with separate data gathering instruments for students, parents, businessmen, and educators. All participants of the study resided within the St. Vrain Valley School District headquartered in Longmont, Colorado. The sample size of the various segments of the community included 10 percent of the student body of the three high schools located in the school district, parents of the students selected, 10 percent of the managers of the business and industrial firms, all faculty members of the three high schools involved, and all administrators and certified staff at the school district's Administrative Service Center. This amounted to a potential of 835 participants. Random sampling techniques were used to identify the potential participants. Data gathering instruments were obtained from 805 participants, or 96 percent of the sample size.

The following conclusions were made after analyzing the obtained data: (1) There is no significant relationship between parents' attitudes toward vocational education and their children's attitudes toward vocational education. (2) There is a significant relationship between certain occupations and income levels of the heads of households and the heads of households' attitudes toward vocational education. (3) Students who are enrolled in a vocational education program and vocational education teachers have significantly more favorable attitudes toward vocational education than those who are not enrolled in or do not teach vocational education courses. (4) Students who plan to attend a four-year college or university have significantly less favorable attitudes toward vocational education than do students who pursue other educational endeavors following high school graduation. (5) There is a significant relationship between the heads of households' attitudes toward vocational education and their experiences with vocational education courses. (6) Students feel school would be more interesting if they could use their hands more and learn a trade while still in high school. (7) There is a strong feeling among all groups that vocational education programs should be expanded. (8) There is strong support for directing community resources toward preparing more high school students for the world of work with the participants willing to share in an increased financial responsibility for world of work programs. (9) Businessmen and educators believe that parents of students place too much emphasis on preparing for college. (10) There is agreement amoung educators and businessmen that there is a need to maintain a closer working relationship between the schools and the business and industrial community. (11) Even though educators show more concern for the student who is not going on to college than any other group, they are the least favorable toward the expansion of vocational education programs. (12) Parents believe that vocational education programs would be helpful to their own children but also believe that their children should prepare for college and university attendance as well.

Order No. 72-31,337, 254 pages.
33: 2834-A Dec '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Sainty, Geoffrey, Edward
(Last name) (First name) (Middle name)

Exact Title An Empirical Study of the Worker Trait Groups in the Third Edition of the Dictionary of Occupational Titles

Degree granted Ph. D., Date 1972, No. of pages in report 133

Granted by Southern Illinois University Carbondale, Illinois
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The primary purpose of the study was the identification of occupational groupings from the Worker Trait Groups of the Third Edition of the *Dictionary of Occupational Titles* (DOT) through the use of clustering analytic techniques. However, this purpose was not achieved. Instead, the major finding of the study was the degree of similarity between the 114 Worker Trait Groups based on the Worker Trait subcomponents. This was confirmed by three clustering methods.

Multivariate cluster analysis, as used in this study, enables the researcher to study the whole pattern of relationships rather than the individual parts. When the profiles containing all the Worker Trait subcomponents for each of the 114 Worker Trait Groups (WTG) are compared the differences suggested by the DOT are not found to exist. Instead, the great degree of similarity between all the 114 WTG's is revealed. The only variables which cause any degree of separation between the groups are those involving educational level. It can therefore be concluded that the Worker Trait components selected by the developers of the DOT are not appropriate for differentiating between occupational groups on the basis of worker characteristics.

The variables in the study were the individual subcomponents of the worker trait components, training time, aptitudes, interests, temperaments, and physical capacities. The review of literature suggested the need to empirically validate the 114 WTG's to determine if they do represent the complete range of occupations as stated in the DOT.

To validate the 114 WTG's the factor structure of the groups was compared with the factor structure of 800 Jobs randomly selected from the report, *Estimates of Worker Trait Requirements for 4,000 Jobs,* which formed the basis for the Third Edition of the DOT. The factor structures of six varimax factors were compared using a cosine technique and found to be similar, thus providing a measure of empirical validity for the 114 WTG's.

Three clustering methods were selected for the development of occupational groupings. The first clustering technique, QUANAL—a Q correlational method—produced three occupational groupings based on a varimax rotation. Only one variable, Specific Vocational Preparation, had a high level of significance. The major conclusion made from the analysis was that based on the worker trait components the WTG's are a great deal more similar than they are different. This conclusion was based on: (1) the extremely high eigenvalue obtained on the first principal component factor, (2) the large number of variables with high loadings on more than one factor, (3) the high correlations, all greater than .85, obtained between the three Q types, and (4) the low number of variables, nine, which significantly differentiated the types.

The optimum number of groups produced by a hierarchical grouping method was four. The major interpretation that was made from the multiple discriminant analysis conducted on the four groups was that there was a great degree of similarity between the four groups. Twenty-eight, thirty-one, and twenty of the subcomponents had significant correlations with the three respective discriminant functions and thirty-one of the subcomponents were correlated with more than one function.

A tree plot of the grouping development using a gravitational clustering method revealed the presence of two groupings within the data. The subcomponents contributing the most to this separation were the ones associated with educational level. The tree plot also confirmed that the groups were similar because the majority of the grouping occurred during the initial stages of the clustering.

Order No. 72-28,551, 133 pages.
33: 2253-A Nov '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Schempf (Last name), Kenneth (First name) William (Middle name)

Exact Title Application of Selected Management Principles in the Operation of University Printing Service

Degree granted Ph. D., Date 1972, No. of pages in report 150

Granted by Kent State University (Name of institution) Kent, Ohio (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

A comparison was made between the operation of university printing, and operations of commercial printing companies doing considerable work for universities. A sample of university printers was chosen, the respondents being the twelve state-supported universities within Ohio. Then a related sample of twelve commercial printers was selected.

Data were collected through interviews with managers of university printing, university administrators responsible for printing, and managers of commercial printing firms. The Pearson product-moment and the Spearman rank-difference correlation coefficients were utilized in analysis of the research results. Two statistical tests were applied: the sign test of differences and the chi-square test of frequency differences.

The differences in operating efficiency between the university and commercial printers under study were shown to be non-significant. This conclusion takes into consideration the lower prices generally charged by the university printers and their negligible marketing expenses. Principles to guide management in the operation of a printing facility were selected from the literature. Differences in their application by the university and the commercial printers were investigated, and a comparative ranking of operating problems was derived.

In dollar volume produced, the university printers were similar to the commercial printers selling most work to the universities. In addition, the two offered a similar range of services and used similar types of printing processes in their plants. They differed significantly in expenditures for paper and materials, and also, in administrative and fixed plant expenses.

Realization of lower costs was ranked by the universities as the principal reason for operating a printing facility. There appeared to be little tendency for the universities with more efficient plants to allocate proportionately more work to them. Two measures of size were utilized: university enrollments and current replacement costs of printing equipment. Neither was correlated with operating efficiency to any considerable extent.

University production was found to be increasing much more rapidly than commercial printing production. However, university investment has apparently been increasing less rapidly than commercial printing investment. During the past three years, the mean percentage increase in investment of the commercial printers was about eight times as large as that of the university printers. This suggests there is current need for substantial investment in university printing facilities, if the growth of in-house printing is to continue.

Order No. 73-13,311, 150 pages.

33: 6632-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Schmidt (Last name), Richard (First name), Wallace (Middle name)

Exact Title A Comparison of Student Attitudes & Learning in Interdisciplinary Approaches in Selected Oregon Occupational Clusters

Degree granted Ed. D., Date 1971, No. of pages in report 80

Granted by Oregon State University (Name of institution) Corvallis, Oregon (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose

The purpose of this study was to make a comparative analysis of student attitudes and learning in relation to the selected academic subject of English when it is applied to certain Oregon occupational clusters. The occupational clusters selected were agriculture, electricity-electronics, industrial mechanics, and stenographer-secretarial occupations.

Method

The comparisons made were centered around the three key questions (1) "How do you *feel* about having English taught as a *part of* the occupational subject?" (2) "How much do you think you *learn* when English is taught as part of the occupational subject?" (3) "How easy or difficult do you think English is when taught as a *part of* the occupational subject?"

Findings

The findings of this study revealed that the students in the experimental group indicated that (1) they responded positively as to how they *felt* about interdisciplinary English, (2) they did not respond in a significantly positive manner as to how much they *learned* from interdisciplinary English, (3) they responded positively as to the *difficulty* or *ease* of interdisciplinary English. This study also indicated that the students had a high performance in vocabulary skills when the vocabulary words were related to an occupational area they were studying. The students also indicated that both English and the occupational courses were effective in preparing them for a career.

Order No. 72-18,868, 80 pages.

33: 2835-A Dec '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author	Schollmeyer, (Last name)	Fred, (First name)	Charles (Middle name)

Exact Title A Comparative Study of Factors Related to Rate of Pursuit of Higher Education by Trade and Industrial Education Teachers

Degree granted Ed. D., Date 1973, No. of pages in report 205

Granted by The Florida State University (Name of institution) Tallahassee, Florida (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Virtually all trade and industrial education teachers are recruited directly from industry, and they usually begin teaching with little or no prior college education.

The problem posed in this study originated with the fact that many of these teachers have aggressively pursued higher education and have earned four-year degrees while others have done little beyond that which is required for the minimum teaching certificate.

A survey of trade and industrial education teachers holding teaching certificates in Florida indicated that out of 426 teachers who started teaching full-time with less than a bachelor's degree, 222 teachers had earned less than 30 semester hours of college credit prior to starting to teach. The annual rate of educational pursuit for the latter group was determined by dividing the number of semester hours of college credit prior to starting to teach. The annual rate of educational pursuit for the latter group was determined by dividing the number of semester hours of college credit earned after starting to teach full-time by the number of years of full-time teaching.

The top 25% of the group, those with the highest rate of educational pursuit, and an equal number of those having the lowest rate of educational pursuit were sent questionnaires dealing with individual personal characteristics, environmental conditions and environmental provisions. An analysis was made of the data to provide answers to three questions: (1) Which of the variables were significantly different for teachers having a high rate of educational pursuit and those having a low rate of educational pursuit? (2) What are the quantitative differences between the two groups? (3) What function(s) of the significant variables allows for the best prediction of rate of educational pursuit?

In seeking answers to the first two questions, the T, F and chi-square tests were used. Statistical tests indicated the variance of the responses of the two groups differed significantly while the mean of the responses did not. Ten of the proportions of the quantitative responses made by both groups also differed significantly.

To answer the third question, a discriminate analysis was run on selected significant variables. Based upon the weighting of the variables, a sub-set of variables was selected, and another discriminate analysis was performed. An equation was obtained with a D^2 value of .79 and an F ratio of 4.08 which had four (4) and eighty (80) degrees of freedom respectively. The probability of obtaining this discriminate function when no difference exists is .005.

The statistical tests performed provided evidence that there was a statistical significant difference between the two groups. Other more specific conclusions were drawn from the findings such as:

1. Neither the size of the school in which those having a high rate of educational pursuit and those having a low rate of educational pursuit taught nor the number of trade and industrial education teachers on the faculty of such schools have an appreciable effect on the two groups.
2. Teaching part-time, or holding another position in addition to teaching full-time, and being required to teach year-round, are more than likely significant to a low rate of educational pursuit.
3. The mean starting ages of the group having a high rate of educational pursuit and the group having a low rate of educational pursuit were not found to be significantly different.
4. Vocational teacher education professors affected the rate of educational pursuit of trade and industrial education teachers by the amount of encouragement they gave such teachers.
5. The frequency of visits made by the supervisor to those teachers having a low rate of educational pursuit was significantly higher than for those having a high rate of educational pursuit.
6. Distance (aside from the extreme) that trade and industrial education teachers live away from an institution of higher learning does not affect the rate of educational pursuit.

Order No. 73-24,297, 205 pages.

34: 1670-A Oct '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Schroeder (Last name), Paul (First name), Erwin (Middle name)

Exact Title The Status of Vocational Education Research, Development, Diffusion, and Evaluation Personnel

Degree granted Ph. D., Date 1973, No. of pages in report 210

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purposes of this study were to identify persons conducting research, development, diffusion, and evaluation (RDDE) activities in vocational education and related fields, to collect data describing those persons and their jobs, and to provide data analyses which would characterize the current status of vocational RDDE personnel and their activities.

A survey questionnaire was designed to collect data describing the respondents' general (personal) characteristics (e.g., sex, age, degrees held, professional association memberships, major, minors, previous work experience), their job characteristics (e.g., place of work, percent time spent on job activities, products and services produced, specific job tasks performed, knowledges/skills utilized), and their in-service training needs.

A group of 1,962 persons thought to be engaged in vocational RDDE activities was identified and surveyed. Of this group, (a) 1,189 persons returned questionnaires (with 786 of the respondents providing useful data for study purposes), (b) no information was obtained about 709 persons, and (c) a telephone interview of 64 persons collected basic information about a subsample of non-respondents.

Of the 786 respondents providing data used in the analyses, 373 classified themselves as being in the vocational education field, 147 were in the non-vocational education field, and 247 considered themselves to be working part-time in both fields (19 persons had missing data on this item). In terms of job functions, 103 classified themselves as researchers, 106 were developers, 26 were diffusers, 52 were evaluators, and 499 were teachers, administrators, other, or combination-function personnel (22 persons did not respond to this particular item). The 212 respondents who classified themselves as vocational or non-vocational R,D,D, or E personnel were of particular interest to the study.

Analyses of the general (personal) characteristics data showed some slight differences between the R,D,D, and E job function groups and the vocational and non-vocational educational field groups. However, the differences were not great enough to provide meaningful indicators for distinguishing among job functions and between educational field groups.

Analysis of the in-service training needs and recent in-service training participation data showed no significant differences between the job function groups or the educational field groups.

Analyses of the data concerning 70 specified job tasks performed and 93 specified knowledges/skills utilized by the respondents showed no major differences in the numbers of vocational and non-vocational personnel who performed the tasks and utilized the knowledges/skills. However, among the R,D,D, and E job function groups significant differences were noted in the numbers of respondents who performed 40 of the 70 tasks and who utilized 88 of the 93 knowledges/skills.

The data revealed: 1) With the exception of subject matter emphasis (e.g., vocational or non-vocational-general academic), and possibly institutional work settings, vocational and non-vocational personnel were for all practical purposes similar to one another in terms of general (personal) characteristics, job characteristics, and specific job tasks performed and knowledges/skills utilized; 2) Job function groups (R,D,D, or E) were not different from one another in terms of general (personal) characteristics, but were different from one another on job products and services produced, and on job tasks performed and knowledges/skills utilized variables; 3) Job function groups (R,D,D, and E) were not different from one another in terms of percent time devoted to performing nine clusters of similar job tasks and utilizing nine clusters of similar knowledges/skills.

The conclusions drawn from the findings were that for the purposes of discussing, defining, and using vocational and non-vocational research, development, diffusion, and evaluation personnel and activities: 1) the differences between educational fields are ones of subject matter focus, and 2) the differences between job functions are ones of job outcomes (products and services) and of specific tasks performed and knowledges/skills utilized. Order No. 73-25,657, 210 pages.

34: 2478-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Schumm (Last name), Fred (First name), Carl (Middle name)

Exact Title The Relative Effect of Two Industrial Arts Curricula on Students' Industrial Arts Achievement and Critical Thinking Ability

Degree granted Ph. D., Date 1972, No. of pages in report 91

Granted by New York University (Name of institution) Washington Square, New York (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The Problem and Its Importance

Industrial education has undergone many changes since it was first introduced in the secondary curriculum in the United States. One such change which has recently come about is the gradual adoption of an innovative program designed for seventh and eighth grades and known as the Industrial Arts Curriculum Project. This innovative program basically uses the same objectives of industrial arts as the conventional program. Therefore, in evaluating the innovative program one of the factors which was considered highly important was how it compared with the conventional program in meeting similar industrial arts objectives.

The problem then, was to determine the relative effect of two seventh and eighth grade industrial arts curricula on students' knowledge of industrial arts and critical thinking ability.

The six research hypotheses tested were:

1 & 2. Eighth grade students who have experienced Ohio State's IACP for two years will show greater achievement in industrial arts than students who have experienced two years of the conventional industrial arts curriculum, (Hypothesis Two) and these students who have had no formal industrial arts education.

3. Eighth grade students who have experienced the conventional industrial arts curriculum for two years will show greater achievement in industrial arts than students who have had no formal industrial arts education.

4 & 5. Eighth grade students who have experienced Ohio State's IACP for two years will display greater critical thinking ability than students who have experienced two years of the conventional industrial arts curriculum, (Hypothesis Five) and students who have had no formal industrial arts education.

6. Eighth grade students who have experienced the conventional industrial arts curriculum for two years will display greater critical thinking ability than students who have had no formal industrial arts education.

Collection of Data

The sample for this research was comprised of three groups of eighth grade male students taken from three schools. Group one, the IACP group, contained all the students (156) who had taken two consecutive years of IACP. Group two, the conventional industrial arts group, contained all the students (150) who had taken two consecutive years of the conventional industrial arts curriculum. Group three, the control group, contained all the students (133) who had taken the same program of studies as the other two groups in their seventh and eighth grades except they did not receive any industrial arts courses.

Treatment of Data

Data were subjected to analyses of variance and covariance. A .05 level was accepted as significant. All computations were performed on the IBM 360-50 computer.

Results of Hypothesis Testing

Hypothesis one was rejected. The computed F-ratio between the adjusted means of the IACP and conventional groups was *not* statistically significant.

Hypothesis two and three were supported. The computed F-ratio between the adjusted means of the IACP and the no-industrial arts groups and the conventional and no-industrial arts groups were significant at the .01 level.

Hypothesis four was rejected. The computed F-ratio between the adjusted means of the IACP and conventional groups was significantly different, however, the adjusted means showed that the conventional group had a higher adjusted mean score than the IACP group. Therefore, hypothesis four was not only rejected but found to be the opposite.

Hypothesis five and six were supported. The computed F-ratio between the adjusted means of the IACP and the no-industrial arts groups and the conventional and no-industrial arts groups were significant at the .01 level.

Conclusions

1. Based upon the results of the *General Industrial Arts Achievement Test* it was concluded that the IACP and conventional students apparently acquired the same amount of knowledge of industrial arts during their two year treatments; both groups performed significantly better than the no-industrial arts control group.

2. Based upon the results of the *Watson-Glaser Critical Thinking Appraisal* it was concluded that the conventional group developed greater critical thinking ability during the two year treatment than the IACP group and the IACP group, in turn, developed greater critical thinking ability than the no-industrial arts control group.

Recommendations

1. Determine what industrial arts courses effect students industrial arts achievement and critical thinking ability more than others.

2. Compare other innovative industrial arts programs to the conventional on the basis of industrial arts achievement and critical thinking ability.

Order No. 72-26,615, 91 pages.

33: 1479-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Schwartz, Frederick, Leonhardt
(Last name) (First name) (Middle name)

Exact Title A Comparative Study of Selected Vocational Education Programs Offered by the Community College and by Industry

Degree granted Ed. D., Date 1973, No. of pages in report 286

Granted by University of California Los Angeles, California
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

As the demands of technology multiply, and society grows more complex, the need for a more highly educated labor force increases. The responsibility for providing the required education is shared by the community college, other educational institutions, and industry. In some fields, a college education is required; in some others both the community college and local industry offer vocational education to qualify the student for an entry job. These fields were the concern of the present study. Specifically, the present study was concerned with the effectiveness of existing community college vocational education programs in fields where the student has the option of obtaining training from either the community college or industry.

To conduct the present study a procedure to determine per-student cost was developed and field-tested. The study was divided into three phases: (I) Program Identification and Description; (II) Data Gathering; and (III) Evaluation.

The initial step in Phase I was to select five occupational areas in which training is widely offered by industry in San Diego. Five fields met this requirement: Auto Mechanics, Data Processing, Dental Assisting, Electronics Technology, and Marketing-Sales. It was possible to identify five local firms that offered vocational education programs in these fields; entry jobs that resulted from participation in these programs; and San Diego Community College vocational education programs that prepared students for employment in these jobs.

Phase II consisted of: (1) gathering data for use in determining cost per student of vocational education in the community college and industry; and (2) surveying local business establishments to compare community college and industrial programs as employment preparation.

Phase III--Evaluation: From the present study it was possible: (1) to draw conclusions concerning the approach to training by the community colleges and industry, the cost of training in each institution, industrial employment and training practices, and determinants of demand for trained personnel; (2) to develop guidelines for use in determining programs to be offered by the community college and to be offered by industry; and (3) to develop recommendations for further studies.

The present study revealed that:

1. Although firms profess to emphasize many community college objectives, their training programs are usually unplanned and limited to training required to perform a specific function or series of functions.
2. Most firms are satisfied with the operation of their training programs but are somewhat critical of community college training.
3. The cost of training, if based on initial enrollments, is lower in the community college. If cost is based on number of completions of the program, it is lower in industry.
4. Firms prefer to hire experienced people and pay them the highest starting wages. Their second choice is community college graduates and their third choice is people to be trained.
5. Community college graduates require more training by the firm in job skills and theory than new-hires who have been trained by previous employers.
6. Firms are more interested in an applicant's attitude, and aptitude for and interest in a job than his educational background.
7. In those areas where the community college offers specific job training, more work-study programs are needed.

Order No. 73-16,701, 286 pages.

34: 219-A July '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Seguin (Last name), Armand (First name), Mathew (Middle name)

Exact Title The Effect of Grouping in the Electronics Laboratory on Cognitive and Psychomotor Achievement

Degree granted Ed. D., Date 1973, No. of pages in report 172

Granted by Arizona State University (Name of institution) Tempe, Arizona (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The overall purpose of this investigation was to compare the relative achievement levels of groups of individuals, pairs, and trios working at electronics technology laboratory stations. The specific questions that this study sought to investigate were:

1. Would the groups of individuals, pairs, or trios attain different levels of achievement on cognitive and psychomotor posttests?
2. Would the groups of individuals, pairs, or trios have different attitudes concerning the laboratory situation?
3. What would the relationship between the cognitive and psychomotor posttests be for each group?

An experimental study was designed using three intact classes totaling ninety-six laboratory students in TE100, Electricity/Electronics at Arizona State University, during the last seven (7) weeks of the Spring semester, 1972. The students met separately for the lecture portion of the class, which was not included in the study. Because the students likely had varying backgrounds in electronics the analysis technique used was that of covariance. A covariate (pretest) was administered prior to the experiment and was used in the analysis of covariance. Twelve laboratory experiments were performed during the study.

One group worked the laboratory experiments as individuals. The second group worked the experiments as randomly assigned pairs, while the third group worked as randomly assigned trios.

The students were administered two researcher-designed posttests measuring cognitive and psychomotor achievement. The students were also given an Attitude Inventory.

The analysis of covariance was employed to test for significance at the five percent level of confidence on all possible comparisons of the three groups. The chi-square test was employed on the Attitude Inventory which was of the Likert-type. Each item on the Attitude Inventory was compared with the corresponding item for the other groups. A Pearson product-moment correlation and an index of forecasting efficiency were also found from the data on the cognitive and psychomotor tests for each group.

A comparison of the individuals and the pairs failed to indicate a significant difference on the psychomotor and cognitive posttests. However, the group of pairs did score significantly higher on both the psychomotor and cognitive posttests than did the group of trios. Further, the individuals scored significantly higher on the cognitive test than did the trios, but did not differ on the psychomotor test.

The attitude of the students did not differ significantly on thirty-two of the thirty-five possible comparisons. The group of trios had a more positive response than the group of individuals concerning the availability of help from the instructional staff. The group of pairs rated the contribution of the partner(s) to the learning situation higher than did the group of trios. Furthermore, the group of individuals scored significantly more favorably than did the group of trios concerning the adequacy of the work space.

The correlation coefficients for the groups of individuals, pairs, and trios were significant at the one percent level of confidence. However, the indexes of forecasting efficiency were only .13 for the individuals, .21 for the pairs, and .18 for the trios.

On the basis of the findings and conclusions of this study the following implications regarding the instructing of students in laboratory situations should be considered by school officials concerning college electronics technology programs: 1. That student work in pairs at laboratory stations. 2. That a student's laboratory grade be based upon an assessment of both cognitive and psychomotor skills. Order No. 73-20,453, 172 pages.

34: 1113-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Serras (Last name), Vidal (First name), Velez (Middle name)

Exact Title An Assessment of Participants' Progress in Education Professions Development Act Vocational Education Fellowship Program

Degree granted Ph. D., Date 1972, No. of pages in report 122

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of the study was to assess the participants' progress in the EPDA Vocational Fellowship Program. The three major hypotheses tested were:

1. No significant relationship exists between previous experiences and self-assessment of progress in knowledge, attitudes, and skills.
2. No significant relationship exists between degree of satisfaction and self-assessment of progress in knowledge, attitudes, and skills.
3. No significant relationship exists among EPDA fellows' self-assessment of knowledge, attitudes, and skills.

Two instruments were developed in the study. A Questionnaire provided information related to the EPDA fellows' previous experiences and degree of self-satisfaction with progress toward the doctorate. A Survey provided information related to the fellows' self-assessment of knowledge, attitudes, and skills in the objectives selected for the study.

RESEARCH DESIGN

The relationship between previous experiences, degree of satisfaction and the fellows' self-assessment of progress in knowledge, attitudes, and skills was examined by means of analysis of variance.

The study examined the relationship between the degree of satisfaction with progress toward the doctorate and the self-assessment of knowledge, attitudes, and skills. Pearson-Product correlation coefficients were computed to study the relationships among the self-assessment of knowledge, attitudes, and skills.

In the analysis of the data, scores in knowledge, attitudes, and skills of fellows with previous specific experiences were compared to the scores of fellows with no such experiences. In addition, the scores of fellows expressing a higher degree of satisfaction with progress were compared to the scores of fellows expressing a lower degree of satisfaction.

RESULTS

It was found that previous leadership experience was significantly related to high scores in attitudes.

Previous research experience was found significantly related to high scores in knowledge, attitudes, and skills in the area of research. Previous experiences in administration and community resources were found significantly related to high scores in skills. A high degree of satisfaction with progress toward the degree was found significantly related with high scores in knowledge and skills, but was not related with attitudes. Total scores of knowledge, attitudes, and skills were found significantly related to one another.

CONCLUSIONS

On the basis of what was found, it appeared that certain experiences prior to the EPDA program were related significantly with the self-assessment of knowledge, attitudes, and skills. Previous research experience was more consistent in relating to high scores in knowledge, attitudes, and skills. EPDA fellows with previous leadership experiences expressed that they were making more progress in attitudes than fellows with no experiences. Degree of satisfaction was related to the fellows' assessment of knowledge and skills. However, there was no significant difference in attitudes between fellows expressing a high degree of satisfaction and those expressing dissatisfaction. In general the EPDA fellows expressed that the fellowship program has helped them "some" to "much" in making progress in knowledge, attitudes, and skills.

Order No. 72-32,260, 122 pages.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Shields, John, David
(Last name) (First name) (Middle name)

Exact Title The Development of the Curriculum of Area Secondary Vocational and Technical Education Centers in Illinois

Degree granted Ph. D., Date 1972, No. of pages in report 169

Granted by Southern Illinois University (Name of institution) Carbondale, Illinois (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

The purpose of this study was to gather, examine, and analyze information about the development of the curriculum in sixteen area secondary vocational centers in operation in Illinois during the 1970-71 school year and to develop some specific findings, conclusions, and recommendations based upon this analysis. A secondary purpose was to examine and analyze the impact that the 1968 Vocational Amendments have had on this curriculum development and to relate that information to the conclusions and recommendations of the study.

Method of Collecting the Data

Data were obtained for this study through four different sources: State records, area center Superintendents, area center Vocational Directors, and area center Vocational Guidance Coordinators. Forty-seven respondents participated in this study. A questionnaire and a structured interview were the major data-gathering procedures. One hundred percent participation was achieved in both the questionnaire and the interview.

Treatment of the Data

The data were hand-tabulated and quantified. A descriptive analysis was used for their presentation. Tables were used to present the existing curriculum of each area center.

Limitation of the Study

This study was limited to sixteen of the eighteen area secondary vocational and technical education centers that were operable in 1970-71. Two area centers that were in operation during 1970-71 were removed from the study.

Conclusions of the Study

1. The Industrial Oriented Occupations area continues to dominate the curriculum of the area centers.
2. Of the five major occupational areas of training in the area centers, the Applied Biological and Agricultural area has been the slowest to develop.
3. The vocational directors have emerged in the leadership role in initiating, planning, and developing new courses in the area centers.
4. The major administrative problems found in one area center are found in the other centers.
5. The formation of joint agreements between schools is a feasible method whereby schools are able to participate in the provisions of the 1968 Amendments.
6. The enactment of the 1968 Amendments has hastened the development of the area center curriculum.
7. There has been minimal cooperation and planning between the area centers and junior colleges.
8. The vocational area center administrators believe legislation needs to be enacted which provides for adequate and stable funding of the area centers.

Recommendations

The writer recommends that the area center steering committees include administrators, supervisors, and lay citizens from the participating schools; the area center vocational director and the junior college dean of vocational and technical education serve on the steering committees of both educational systems; and the area center superintendents and directors and the junior college vocational deans meet semi-annually with the State director of vocational education to study the development of vocational education in Illinois. The writer also recommends that adequate funding be appropriated to provide for a stable per student reimbursement and for the development of career education orientation at the elementary level for prevocational education at the ninth and tenth grades, and for the development of programs to meet the needs of emerging and future occupations. Finally, the writer recommends that the formation of some joint agreements be encouraged, the area centers meet the requirements of the 1968 Amendments, and State consultants be provided to assist in planning, coordinating, developing, and evaluating local schools, area centers, and junior colleges career education programs.

Order No. 72-28,555, 169 pages

33: 2254-A Nov '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Shinn (Last name), Marion (First name), Luther (Middle name)

Exact Title History of Vocational Education in Idaho

Degree granted Ed. D., Date 1972, No. of pages in report 365

Granted by University of Idaho (Name of institution) Moscow, Idaho (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose

The purpose of this study was to accumulate, organize and record unique events in the development of vocational education in Idaho from 1917 to 1971.

Significant topics investigated were:

1. The history of the development of the State Department of Vocational Education and the State Board for Vocational Education in Idaho
2. The development of teacher training for vocational teachers in Idaho.
3. The development of vocational-technical education instructional programs in the secondary schools and in the industries of the state of Idaho.
4. The development of vocational-technical education instructional programs in the post-secondary institutions in the state of Idaho.
5. The development of professional organizations for vocational-technical education in Idaho.

Organization of the Study

The study was divided into five parts representing the history of each of the significant questions investigated in this study. The growth of the occupational divisions of agriculture, distributive education, commerce, office occupations, home economics, and trade and industrial education were investigated in their chronological development.

Methodology

1. A study was made of identifiable printed materials relating to the history and development of vocational education in Idaho.
2. Interviews were held with persons associated with vocational education who were identified through personal knowledge, direct referral, or by reference in the printed materials.

Summary

Vocational education developed in Idaho after the acceptance of the Smith-Hughes Act by a proclamation by the Governor in 1917 and the formal approval by the legislature in 1919. A Director of Vocational Education was appointed as chief administrative officer with State Supervisors in charge of specific occupational divisions.

A system of teacher training was established for all of the three designated occupational divisions in 1918. Teacher training programs in agriculture and home economics were established at the University of Idaho; a part-time teacher trainer was designated at the Idaho technical Institute for trades and industries preparatory classes; and the State Supervisor provided itinerant teacher training to part-time trade teachers throughout the state in trades and industries. The teacher education programs were expanded at the University as new occupational divisions were developed under vocational education. A department of vocational teacher education was established at the University of Idaho in 1971.

Agricultural education and home economics education programs were developed through the secondary schools of the state. Trade and industrial education was developed through the industries and the trade school at Pocatello before World War II. Trade classes were developed as high school preparatory classes after World War II. Distributive education and office occupations became part of vocational education and were developed as part of the secondary school curriculum.

Post-secondary schools were developed soon after World War II. These schools were attached to institutions of higher education at Pocatello, Boise, and Coeur d' Alene. After the enactment of the Vocational Education Act of 1963 these schools were designated as Area Vocational Schools and additional post-secondary area schools were established at Twin Falls, Lewiston, and Idaho Falls.

The Vocational Education Act of 1963 and the Vocational Amendments Act of 1968 added many more responsibilities to vocational education and altered the curriculum and programs in both the high school and post-high school levels. The existing programs were expanded to better serve the increasing student demand for vocational education. Additional programs were developed to the special needs of specific population groups.

Professional organizations developed in each occupational division to serve the needs of the vocational instructors. The Idaho Vocational Association provided a medium through which the vocational teachers of the state could join to promote vocational education through the American Vocational Association.

The expansion of vocational education in Idaho has included an increase in students served; an increase in occupational areas; an expansion of the age levels that could be served by the full-time program; and extension of the kinds of services that could be provided to students. The expansion became possible through cooperative agreements between the state and Federal government through a State Plan for Vocational Education.

Order No. 72-30,520, 365 pages.

33: 2254-A Nov '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Shoemaker (Last name), Jim (First name), G. (Middle name)

Exact Title Arkansas Vocational-Technical School Personnel Characteristics as Related to Personnel Perceived Needs for Professional In-Service Education

Degree granted Ed. D., Date 1973, No. of pages in report 142

Granted by University of Arkansas (Name of institution) Fayetteville, Arkansas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

I. Problem

The controlling purpose of this study was to collect and analyze data that would provide a basis for recommendations for a future program of in-service education for vocational-technical personnel in Arkansas. Secondary purposes included: (1) to develop pre-employment education and experience profiles for personnel, (2) to provide a comprehensive record of the current status of personnel, and (3) to establish a common base of information regarding vocational teacher preparation.

II. Procedures

Two instruments, a personnel information questionnaire and an in-service education needs inventory, were used to collect data from personnel in secondary and post-secondary vocational-technical schools, Southwest Technical Institute, the vocational-technical personnel at the University of Arkansas at Pine Bluff, Phillips County and Westark Community Colleges, and the trade and industrial teachers in the comprehensive high schools.

The data were tabulated and organized in text and table form. The t test and one-way analysis of variance were used to determine the level of difference in personnel perceived needs due to age, education, teaching experience, level of responsibility, and level of instruction.

III. Conclusions

The following conclusions were made:

1. Personnel with degrees tended to be younger than non-degree respondents.
2. There was little difference between the age levels of secondary, post-secondary, and community college and technical institute personnel.
3. The variety of occupational subjects taught in most of the schools was rather narrow. Over 50 per cent of the 317 instructors were teaching in only five of the 36 subject areas reported by the respondents.
4. A rather large number of personnel had what appeared to be only minimal (0 to 2 years) of occupational experience.
5. Personnel entering vocational education with less than a four-year degree had made little progress toward a degree.
6. Personnel with degrees showed significant progress toward the acquisition of additional professional education.
7. Arkansas vocational-technical school personnel did perceive a need for professional in-service education.
8. Personnel with degrees sensed a greater need for in-service education than did those with less formal education.
9. Administrators felt a greater need for in-service education than was perceived by instructors.
10. Older personnel perceived a greater need for in-service education than did the under 40 age group.
11. Personnel with less than four years of employment in education reported a greater need for in-service education than was reported by more experienced personnel.
12. There were significant differences in the perceived in-service education needs of secondary, post-secondary, and community college and technical institute personnel.
13. Past efforts toward in-service education in Arkansas had not completely satisfied the needs of vocational-technical school personnel.
14. The lack of educational mobility, especially for the less-than-degree personnel, indicated a need to find alternate approaches to professional education for the group.
15. The differences in the perceived needs of the groups, as differentiated by personnel characteristics, generally indicated levels of need rather than lack of need.

IV. Recommendations

The following recommendations were made:

1. A comprehensive vocational-technical school personnel records system should be established in the Vocational Division of the State Department of Education. This should include both entry and current data on the status of personnel with an analysis of their educational needs.
2. The staff of the Vocational Teacher Education Department at the University of Arkansas and personnel from the Vocational Division of the State Department of Education should give close attention to the data compiled in the study for the purpose of designing a curriculum tailored to the perceived needs of personnel.
3. The items of greatest perceived need should be given special treatment through the development of new curricular materials and techniques of presentation.
4. Personnel in charge of in-service education for vocational-technical school personnel in Arkansas should investigate the prospect of an alternate, tuition-free, system of professional level vocational courses for personnel employed in, or training for, reimbursable vocational programs.

Order No. 73-27,448, 142 pages.

34: 2479-A Nov '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Shunn (Last name), Donald (First name), William (Middle name)

Exact Title The Effects of the Fisher Bill on the Secondary Industrial Arts Program in Public Supported California Schools

Degree granted Ed. D., Date 1972, No. of pages in report 220

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Statement of Purpose

The purpose of this study was to: (1) enumerate several important requirements of teacher certification, (2) to specify the provisions of the Fisher Bill relating to those requirements, and (3) to examine the effects of those specifications on the certification of industrial arts teachers in secondary education in California.

Research Design

Two questionnaires were used to solicit information from: (1) state supported public colleges which had industrial arts teacher preparation programs, and (2) secondary school districts which provided industrial arts instruction (so secondary school district over 100 000 population participated in this study). The questionnaires were both subjective and objective and provided statistical information as well as opinions from the participants.

Findings

1. Before the Fisher Bill the college industrial arts curriculum for the preparation of teachers varied greatly between institutions. 2. As a result of the Fisher Bill several changes were made which effected the teacher preparation programs. 3. The Fisher Bill tended to restrict the academic choice of students by placing an academic emphasis on the requirements for graduation. 4. These subjective effects of the Fisher Bill were felt at each college: quality of students decreased, prestige of discipline was lowered, problems were created in programs, and the loss of the industrial arts minor programs. 5. Prior to the Fisher Bill the public school districts had little or no problems in finding qualified industrial arts teachers. 6. During the Fisher Bill period the annual attrition rate of the industrial arts teachers nearly doubled. 7. The Fisher Bill created a shortage of industrial arts teachers. 8. The Fisher Bill did not encourage teachers to further qualify themselves. 9. The quality of the teachers decreased as a result of the Fisher Bill.

Conclusions

1. Prior to the Fisher Bill the colleges had a well organized but varied program. 2. A great diversity of electives resulted from the Fisher Bill. 3. A greater flexibility of requirements resulted with the demise of the Fisher Bill. 4. The Fisher Bill tended to limit the industrial arts students in the choice of a minor area. 5. Industrial arts students, faculty, and departments suffered in quality, prestige, and curriculum during the life of the Fisher Bill. 6. Prior to the Fisher Bill school districts employed those teachers who were well qualified as industrial arts teachers. 7. Prior to the Fisher Bill annual attrition rates were lower. 8. A shortage of industrial arts teachers was created. 9. The quality of industrial arts teachers decreased as a result of the Fisher Bill. 10. With the demise of the Fisher Bill the quality of industrial arts teachers tended to improve.

Recommendations

1. The industrial arts departments of the state supported colleges should continue to evaluate the requirements for graduation. 2. The University of California should play a key role in emphasizing occupationa training. 3. All state institutions of higher education should emphasize teacher preparation in industrial arts. 4. Emphasis should be made in the public schools on the value of work. 5. Career programs should be based on labor market studies at the secondary level. 6. A gradual elimination of life certification should be undertaken. 7. An intensive and extensive study on the effects of the Fisher Bill should be conducted. 8. Advisory councils should be organized at every level which would focus on the industrial arts programs and the needs of the community, state, and the nation. Order No. 72-33,985, 220 pages.

33: 3348-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Shymoniak (Last name), Leonard (First name), Roy (Middle name)

Exact Title The Analysis of Costs and Effectiveness of Vocational Education Programs in Three Selected California Community Colleges

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 193

Granted by University of California (Name of institution) Los Angeles, California (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Problem. This study, in addressing itself to the needs of the local administrator, assumed a cost-effectiveness analysis framework to determine the cost and the effectiveness of general and vocational education programs in three California community colleges. The costs of training graduates were analyzed in terms of (1) current operating costs, (2) capital costs of instructional equipment, and (3) job-search and on-the-job training costs. The effectiveness of vocational programs was measured on the basis of labor market experiences of graduates during the first two years after leaving college.

Procedures. The procedures used to collect and analyze program cost data were adapted from Lindman, *Developing Alternative Models for Financing Vocational Education*, and the California State Department of Education Manual, *Planning, Programming, Budgeting System Manual for State of California School Districts.* Two types of unit costs were presented for the different programs considered: the cost per Student Contact Hour, and the incremental cost of training a graduate.

Data required to measure the effectiveness of vocational education programs were obtained through a mail questionnaire *(Follow-Up Survey of Community College Graduates)* specifically developed for this study. This instrument was administered to stratified samples of general and vocational education graduates approximately two years after they had left college. Using two reminder letters and selected telephone calls, an 80.8 percent return was obtained. Stepwise multivariate linear regression analyses were used to determine the effects of vocational education on unemployment and earning rates, holding constant the factors of sex, age, cumulative GPA, ethnic origin, and father's level of education.

Findings. Analysis of the cost data indicated considerable variation in the unit cost of instructional program at the intercollege and the interprogram level. In general, it was found that training a vocational education graduate in the three colleges studied was more costly than training a general education graduate. The incremental cost (i.e., the additional cost required to train a vocational graduate as compared to a general education graduate) was estimated to be of the following order of magnitude for the different programs: Agriculture, $659; Office, $204, Distributive, $90; Health, $1,372; Technical, $710; and Trade and Industry, $708. Two factors identified as contributing most to this incremental cost were: (1) the higher cost per Student Contact Hour attributable to lower level utilization of facilities, instructional equipment, and faculty resources in vocational education; and (2) the greater number of contact hours of instruction received by vocational education graduates.

Three of the five programs analyzed for effectiveness were found to be successful in attaining their objectives. The study estimated that the benefit gained by graduates of these three programs was about $1,300 for each of the first two years after leaving college.

Recommendations. The study recommended that the implementation of utilization standards be considered as a means for more efficient use of educational resources. More extensive use of follow-up surveys, improved placement programs, and utilization of manpower needs data for planning were recommended as a means for increasing the effectiveness of the community college programs.

Order No. 72-25,837, 193 pages.

33: 1388-A Oct. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author Simmons, Darrell, DeWitt
(Last name) (First name) (Middle name)

Exact Title A Theoretical Basis for Industrial Arts in the Public Schools.

Degree granted Ed. D., Date 1958 No. of pages in report 236

Granted by University of Tennessee Knoxville, Tennessee
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To clarify and, in some degree, reduce the confusion that appeared to exist in the area of industrial arts by investigating the theoretical basis for industrial arts in the public schools.

Source of data and method of study: Investigation was made into the following topics in arriving at a theoretical basis: 1) History and trends of industrial arts; 2) Nature of Man (biological, philosophy, theory of learning); 3) Modern culture, (traditions, machines, institutions, science, democratic concept). Learning needs were then developed which were employed in program direction using guiding principles for adequate direction.

Findings and Conclusions:

Industrial arts programs were then described, in broad outline, for:

Primary Grades - Because children learn rapidly through play, activities which employ manipulating appropriate industrial materials are incorporated in the play activity. In these grades, learning is a continuous process that tends to employ the total organism. Activities are to be integrated into this learning process and become a part of it.

Intermediate Grades - The inclusion of activities of an industrial arts nature becomes more difficult in these grades. Increasingly complex activities should be encouraged in this age group. This will result in a need for special competence on the part of the staff and additional laboratory space and equipment to meet the needs and problems of the student.

High School - The nature of the high school and its organizational pattern of narrow and specialized subject matter areas does not lend itself favorably to an integrated program having unity and singleness of purpose--the development of an intelligent citizen for an industrial culture. Many changes need to be made in the present concepts of industrial arts--its content, purpose, and methodology such as:

1. Reduction of departmentalization and the unit shop concept.
2. Acceptance of the idea that the industrial arts program is an educationsl program rather than a training program.
3. Belief in the idea that the student who experiences great difficulty is a slow learner rather than a "dumbbell."
4. Make project selection and development compatible with real problems of the student.
5. Integration of learning activities with the activities of other subject areas.
6. Increased understanding and use of appropriate guidance principles.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Skouby, Eric, William
(Last name) (First name) (Middle name)

Exact Title An Occupational Analysis of Electromechanical Technician Occupations With Implications for Curriculum Development

Degree granted Ed. D., Date 1972, No. of pages in report 145

Granted by Oklahoma State University Stillwater, Oklahoma
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

SCOPE OF STUDY: The primary purpose of this study was to conduct an occupational analysis of electromechanical technician occupations in order to determine the frequency of performing selected tasks and the area of activity in which these tasks are performed. A secondary purpose of this study was to analyze and organize occupational analysis data in preparation for writing educational objectives for an electromechanical technician education program.

An occupational analysis questionnaire was completed by 66 supervisors of electromechanical technicians and 137 electromechanical technicians from 57 industrial establishments. The selected electromechanical tasks in the questionnaire were chosen from the fields of electronics, mechanics, fluids, acoustics, thermodynamics, and optics. For each task, the interviewee responded to a frequency of use and a primary area of activity of task performance. Also included in the questionnaire were tasks related to communications, and mathematics along with selected shop tools and test equipment. For these, only a frequency of use was indicated.

FINDINGS AND CONCLUSIONS: When the tasks were ranked by the number of supervisors and technicians indicating a frequency of use, the Spearman rank coefficient of correlation was .93. The area of activities most often indicated by the supervisors and technicians were testing, troubleshooting, and analyzing.

The information from the technicians was separated according to the number of years of experience of the technicians. These categories were 0 to 2 years, 3 to 5 years, 6 to 10 years, and over 10 years of experience. Some tasks showed an increase or decrease in rank with an increase in years of experience of the technician, but no general trend could be established. There was a change in the area of activities of performing the tasks with increasing years of experience. Troubleshooting and testing were two major areas of activity for all four categories. Instructing showed a slight increase as primary activity with years of experience while analyzing showed a large increase. Calibrating and repairing showed a slight decrease as primary activity with increased years of experience.

The information from the technicians was then separated by major emphasis of work. These categories were research and design, production, maintenance, and others.

When the ranking of the electromechanical tasks in the four categories was compared, the Spearman rank coefficient of correlation was highest for production versus maintenance and lowest for research and design versus others. The ranking of the other tasks, tools, and test equipment showed a high correlation between all categories.

Order No. 73-15,239, 145 pages.

33: 6657-A June '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Smith, Carroll, Watson
(Last name) (First name) (Middle name)

Exact Title An Application of the Aschner-Gallagher Classification System to the Behavior of Selected Seventh Grade "Maryland Plan" Industrial Arts Classes

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 311

Granted by University of Maryland College Park, Maryland
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Statement of the Problem. The problem of this study was to determine and classify the thought processes used in the teacher-pupil verbal interaction of selected "Maryland Plan" industrial arts classes by means of the Aschner-Gallagher Classification System.

The classifications were made according to (a) the source of the utterance—teacher or pupil; (b) the form of the utterance—statement or question; (c) the instructional setting in which the utterance occurred—laboratory, seminar, or lecture-demonstration; and (d) the type of thought process inferred from the content and context of the utterance.

Two associated problems were (a) to determine the relationship of the thought processes solicited by pupils during laboratory sessions and those supplied in response by their teachers, and (b) to determine the relationship of positive teacher verdicts of pupil performance and the productive thought processes used and requested by their classes.

Statement of the Purpose. The purpose of the study was to apply the Aschner-Gallagher Classification System to the verbal and non-verbal behavior of selected seventh-grade "Maryland Plan" industrial arts classes so that the thought processes used by teachers and pupils could be identified. Providing information about the kinds of thinking used by teachers and pupils in these classes was another purpose of the study. A third purpose was to provide data and develop procedures with which other investigations of verbal behavior could be compared and analyzed.

Subjects and Procedures. Nine seventh-grade "Maryland Plan" industrial arts classes were selected according to criteria established for the study. Eight classes were used for the main study and one class for the pilot study. Five simultaneous tape and observer recordings were made for each of the main study classes over a period of six weeks during the spring semester of 1971. The tape and observer recordings were transcribed into typewritten tapescripts. Ninety minutes of laboratory, sixty minutes of seminar, and fifteen minutes of lecture-demonstration verbal interaction were randomly selected from the tapescripts for coding by the primary tapescript judge. A second tapescript judge was selected and trained to use the adopted category system. The second judge coded a ten percent random time sample from the main study tapescript sample to provide a reliability check for the primary tapescript judge. Both inter- and intra-judge reliability measures were calculated. The coding classifications of the primary tapescript judge were tabulated according to speaker, utterance form, and instructional setting for each class and for all classes combined.

Findings.

1. Teacher utterances accounted for 55% of all category classifications. Pupil utterances received 45%.

2. The ratio of category classifications for statements to questions was 8 to 3 for teachers and 7 to 2 for pupils.

3. Convergent thinking received the largest percentage of teacher and pupil statement classifications for the laboratory sessions. Convergent thinking also received the largest percentage of teacher and pupil question classifications for the laboratory sessions.

4. Divergent thinking received the smallest proportion of teacher statement and question classifications for the laboratory, seminar, and lecture-demonstration sessions. Divergent thinking also received the smallest proportion of pupil statement and question classifications for the three types of sessions.

5. Pupil utterances accounted for 35% of the laboratory, 80% of the seminar, and 19% of the lecture-demonstration category classifications. Teacher utterances received 65% of the laboratory, 20% of the seminar, and 81% of the lecture-demonstration classifications.

6. Sixty-five percent of pupil laboratory questions of teachers were met with congruent teacher responses. Teachers gave redirected question responses to 11% of pupil laboratory questions.

7. A high but non-significant Pearson product-moment correlation coefficient of +.700 was observed between high total frequencies of positive teacher verdicts and a high mean percentages of productive thinking statement classifications by classes.

8. A non-significant Pearson product-moment correlation coefficient of only +.183 was observed between high total frequencies of positive teacher verdicts and high mean percentages of productive thinking question classifications by classes.

Order No. 72-29,633, 311 pages.

33: 2143-A Nov. '72'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Smith, Kenneth, Temple
(Last name) (First name) (Middle name)

Exact Title Effects of an Individualized Systems Approach Curriculum Model in a University Level Graphic Arts Program

Degree granted Ed. D., Date 1972, No. of pages in report 167

Granted by University of Northern Colorado Greeley, Colorado
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The Problem

The purpose of this study was to investigate the effects of an individualized curriculum systems design known as learning activity packages, as judged by data obtained within an experimental atmosphere consisting of two University of Northern Colorado industrial arts classes in beginning graphic arts. Total number of students involved within the study was thirty.

The specific areas of inquiry dealt with answers to the following questions: (1) What is the relationship between achievement using learning activity packages and select personality factors? (2) What relationship exists between chronological age, experience, grade point average and one's ability to accept the learning activity package? (3) What is the effectiveness of the model of the curriculum systems design known as learning activity packages? (4) What changes in student attitudes will occur about the curriculum systems design from initiation to completion of the course? (5) What are the recommendations for redesign and improvement of the individualized curriculum system design at the university level?

Methods and Procedures

Data was obtained from student questionnaires, student data cards, anecdotal records, LAP achievement cards and student evaluation sheets. Statistical treatment was accomplished by using Pearson Product-Moment correlations. The level of significance was established at the .05 level of confidence. Additional available data included individual scores from the Sixteen Personality Factor Test.

Findings

The results are reported below:

1. Term achievement distribution evolved into a positively skewed curve. 2. Select personality factors as measured by the Sixteen Personality Factor Test were incapable of predicting term achievement. 3. Chronological age and previous military or industrial experience were incapable of determining whether a student had the ability to accept the learning activity package. 4. Student grade point average is an effective measure of a student's ability to accept the learning activity package. A correlation between term achievement scores and grade point averages produced an r of .405 which is significant when examined at the .05 level of confidence. 5. Students' attitudes regarding the use of the curriculum systems design were positive. They favored the continuance of learning activity packages as the vehicle for instruction for IA 141, the course which was investigated. 6. Students' recommendations for redesign and improvement of the individualized curriculum systems design included (1) complete dissemination of the teacher's role in an orientation program, (2) determining time lines for each objective, and (3) the regeneration of more technical oriented activities correlating with the basic graphic arts concepts.

Conclusions

The results were interpreted to indicate that:

1. Variation of term achievement scores is considerable in indicating that individualization of instruction using learning activity packages does not meet the needs of some students. 2. The Sixteen Personality Factor Test cannot be used as a predictor of success in an individualized program using learning activity packages. 3. The present curriculum systems design should be modified according to the recommendations within this study to assure a more effective design. 4. IA 141, "Graphic Arts," should continue the implementation and regeneration of learning activity packages as its curriculum vehicle. 5. The findings in this study have implications for educators who are considering implementing learning activity packages as a curriculum vehicle. These findings include consideration concerning systems design and application.

Recommendations for Future Study

Additional investigation is required to determine criteria that can be used to indicate those students who would be successful in an individualized curriculum systems design. Identification of characteristics possessed by low achievers using this system should be determined and alternate approaches devised for greater student success.

Order No. 73-314, 167 pages.

33: 3348-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Sola (Last name), Peter (First name), Andre (Middle name)

Exact Title Plutocrats, Pedagogues and Plebes: Business Influences on Vocational Education and Extracurricular Activities in the Chicago High Schools 1899-1925

Degree granted Ph. D., Date 1972, No. of pages in report 283

Granted by University of Illinois at Urbana (Name of institution) Champaign, Illinois (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The increase of technology and the expansion of industry during the first two decades of the twentieth century created a need for vast numbers of trained workers. The most direct and least expensive method of securing trained manpower, many Chicago businessmen believed, would be to encourage the schools to assume the task of training the students as potential workers and consumers. The schools, businessmen believed, were lagging behind in their education of the twentieth century student. Latin and Greek, it was argued, were not as important as machine shop and bookkeeping.

While commercial interests expected students to be trained in the courses necessary for the office: bookkeeping, accounting and stenography, and industry needed skilled factory workers to operate the increasingly complex machinery of the assembly line, business also needed a specific type of person for an employee. The worker had to be obedient, careful, dependable, docile and able to feel he had a role to play in maintaining the stability of the community. Such a person could be taught to believe that this was the best of all possible worlds and therefore would be reluctant to question his job, employer or nation. The schools would be an ideal place to train the student-worker in these values. Since many of the factory and office workers of the early 1900's came from the southern and eastern Europe countries, the businessmen and educators believed that in addition to technical training these groups needed to be Americanized. In conjunction with Americanization and vocational training, business interests introduced vocational guidance to channel the students in the proper direction. The guidance counselors tried to persuade the child to finish school: if, however, he wanted to drop out, he would be properly placed in a position suited to his aptitude and ability.

The Chicago Association of Commerce and the Commercial Club, representatives of Chicago's businessmen, were involved in shaping educational policy and practices with the Chicago Board of Education. In some instances they acted as an advisory group to the Board and at other times as initiators of legislation. They suggested curricula for commercial as well as industrial education and even advised the Board when and where to build vocational high schools. The Chicago Association of Commerce also moved directly into high schools influencing both student and teacher in the schools' extracurricular activities. Speakers were provided to present the business point of view to the student assemblies. It appears that the Association of Commerce was granted access to the school which was denied to other special-interest groups. This occurred, it seems, because the Chicago School Board appreciated and often agreed with the philosophy of the businessmen.

This study examined the educational changes the business interests implemented in the Chicago schools. It analyzed these changes and the ways in which they furthered the goals of the business establishments of Chicago.

Order No. 73-17,431, 283 pages.

34: 594-A Aug '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Sorenson, Warren, William
(Last name) (First name) (Middle name)

Exact Title A Proposed System for Predicting Costs of Vocational Education Programs in the California Community Colleges

Degree granted Ed. D., Date 1972, No. of pages in report 110

Granted by University of California Los Angeles, California
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The primary purpose of this study was to develop a system for predicting current instructional costs of vocational education programs for the community colleges of California. For analysis purposes, the study was divided into five major parts --data selection, data gathering, data analysis, statistical analysis, and institutional characteristics.

Data from nineteen community colleges in California were analyzed. Program cost data were taken from forms CCAF-301 and VE-2b, as reported by each college district to the Office of the Chancellor, California Community Colleges. Instructor-to-student ratio information was gathered from each of the selected community colleges. This ratio is expressed we weekly student contact hours.

Two prediction formulas were applied to each of the seven vocational program areas. The formulas were:

Formula I: $Cv = \bar{Co} \times \frac{\bar{No}}{\bar{Nv}} \times \bar{P}$

Formula II: $Cv = \bar{Co} \times \frac{\bar{No}}{\bar{Nv}} + \bar{Co} \times \bar{R}$

Where: Cv = annual instructional cost per average daily attendance for each vocational program

$\bar{Co}$ = mean average instructional cost per average daily attendance for non-vocational students

$\bar{No}$ = mean average weekly student contact hour per non-vocational instructor

$\bar{Nv}$ = mean average weekly student contact hour per instructor in the vocational program

$\bar{P}$ = program factor

$\bar{R}$ = program factor

Programs in agriculture, health, office, technical, and trades and industry were more costly than the mean cost for non-vocational instruction.

Formula I proved to be the better prediction formula. The formula was able to "explain" the amount of variance among actual program costs for programs in agriculture, health, home economics and trades and industry. Formula I "explained" the following percent of variance: Agriculture – 55.0%. Health – 15.6%. Home Economics – 36.6%. Trades and Industry – 21.7%.

Neither formula could "explain" variance among actual program costs for programs in distributive, office or technical.

No excess cost was found for programs in home economics and distributive education. Larger program enrollments appear to be less costly. There is a wide range of expenditure per student for similar programs conducted by different colleges.

Order No. 72-33,987, 110 pages.

33: 3497-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Spooner (Last name), Kendrick (First name), Lewis (Middle name)

Exact Title Establishment of Process Variables for Formative Curriculum Workshop Evaluation

Degree granted Ph. D., Date 1973, No. of pages in report 131

Granted by The Ohio State University (Name of institution) Colombus, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study focuses upon the problem of identifying and testing important and predictive process variables for formative curriculum workshop evaluation.

Five curriculum workshops sponsored by The Center for Vocational and Technical Education at The Ohio State University were extensively evaluated in both the formative and summative setting.

The purpose of this study is to determine the validity of the assumption that a relationship exists between the perceptions of workshop participants as to (1) the successfulness of the event in achieving its objectives, (2) the quality of instruction offered by the conference presenter, and (3) the quality of participants' performance in producing a product for the workshop and the achievement of the workshop objectives.

The four general questions listed below reflect more specifically the problem statement.

1. Is there a significant positive correlation between the quality of workshop participants' performance and the achievement of workshop objectives?
2. Is there a significant positive correlation between the workshop participants' perception of the quality of the instruction given by the workshop directors and the achievement of workshop objectives?
3. Is there a significant positive correlation between the workshop participants' perception of achievement of workshop's objectives on the last day of the workshop and the actual achievement of the workshop objectives?
4. Is there a significant positive correlation between the workshop participants' general reaction to the workshop and the achievement of workshop objectives?

Correlation analysis was used to test the four hypotheses generated from the four general questions listed above.

The descriptive analysis indicated that there were some slight differences in the makeup of the participants of the workshops. The institutions represented at the workshops were similar: police academies and community colleges--technical institutions. The data presented would help one generalize the findings to other workshop and conference settings.

The between- and within-workshop analysis of the relationship of the process variables (independent) to the criterion (dependent) variables indicates that some relationships do exist between how participants respond to the Confidence Scale and the quality of lesson plan product to the adoption of the curriculum materials.

The logical negative relationships which are most relevant are:

(1) Participants that have rated high confidence in achieving the short-range workshop objectives are more likely to reject the developed curriculum materials.

(2) Participants that produce high quality lesson plans for the curriculum package are more likely to reject the developed curriculum materials.

These two relationships are consistent in that if one believes he can develop lesson plans and then he does develop good lesson plans, why should he accept other participants' material when he can prepare better material himself. In other words, if one is confident he can develop lesson plans and has success in developing lesson plans, chances are he will develop his own material and not use the curriculum materials developed at the workshop.

There were no significant relationships found between any of the process variables (independent) and the criterion variable.

The recommendations are made in light of the findings:

(1) The Center should institute a systematic follow-up study for summative workshop evaluation.

(2) The Center should evaluate the instrumentation used for process evaluation of its workshops and develop instrumentation which efficiently measures their desired constructs.

(3) The Center should consider new process variables which might act as predictors of outcome or long-range workshop objectives.

The implications of this study have direct impact on The Center for Vocational and Technical Education workshop evaluation procedure. Also there are wider applications for the recommendations offered. The findings question the validity of currently used instrumentation for workshops, conferences and seminars and indicate a need for indepth evaluation of evaluative processes used in these short-term, high-exposure settings.

Order No. 73-18,953, 131 pages.

34: 681-A Aug '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Stemmer, Roland, Clarke
(Last name) (First name) (Middle name)

Exact Title A Study of the Whole Job (Multi-Position) Approach as Compared to the Traditional (Single-Position) Approach in the Development of Arc Welding Skills

Degree granted Ed. D., Date 1973, No. of pages in report 90

Granted by Oregon State University Corvallis, Oregon
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The major consideration of this study was the testing of the superiority of the whole or part method for developing basic arc welding skills. Data were also generated which facilitated investigation of: (1) the relationship of welding skill development to cognitive attainment of welding information as measured by welding proficiency post-test scores and written test scores, respectively; (2) a comparison of skill development among three levels of students grouped according to welding proficiency pretest scores; and (3) a comparison of welding skill development of students in separated and mixed (whole or part method) welding sections.

Fifty-five students comprised the population for this study. Subjects were selected from beginning welding students enrolled in day or evening programs at Everett Community College during the Fall and Winter quarters of the 1971-72 school year. Students selected for participation were programmed through a 15-hour practice session running flat and overlapping flat beads.

Students were tested and paired according to similarity of welding proficiency pre-test scores. Pairs were split or arbitrarily assigned to the whole or part method of learning.

Four welding sections were homogeneous; that is, contained only whole- or part-method students. All other welding sections were heterogeneous; that is, both whole- and part-method students learning together.

Three welding positions, horizontal, vertical, and overhead, were selected as the learning elements used to test the whole versus part method of learning. That concept was implemented by assigning students to one of two sequences.

Whole-method, experimental students practiced a total of 45 hours. The welding practice sessions were divided into three equal parts, time-wise. Each student practiced one-third of each session on horizontal fillet welds, one-third on vertical fillet welds, and one-third on overhead fillet welds. This schedule was followed until 45 hours of practice were completed.

Part-method, control students utilized the following sequence: (1) fifteen hours of welding practice on horizontal fillet welds, then (2) 15 hours of welding practice on vertical fillet welds, and finally (3) 15 hours of welding practice on overhead fillet welds.

Upon completion of a 45-hour practice schedule, all students made fillet weld test plates in the three positions and were tested on the cognitive aspects of welding which were judged relevant. The welding proficiency and cognitive test scores provided the data for the statistical test of each of the hypotheses.

Within the limits of this study, the following conclusions are evident concerning the hypotheses: 1. Whole (experimental) and part (control) method students demonstrated no statistically significant difference in the level of welding proficiency. 2. Students who scored highest on the pre-test demonstrated statistically significant higher welding proficiency post-test scores than students who scored lowest on the pre-test. 3. Whole-method students in mixed classes demonstrated statistically higher welding proficiency post-test scores than their counterparts in segregated classes. 4. There was practically no linear relationship or commonality between welding proficiency post-test scores and cognitive test scores.

Order No. 73-7847, 90 pages.

(33: 4812-A) March '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Stephens, Kent, Gordon
(Last name) (First name) (Middle name)

Exact Title A Fault Tree Approach to Analysis of Educational Systems as Demonstrated in Vocational Education

Degree granted Ph. D., Date 1972, No. of pages in report 273

Granted by University of Washington Seattle, Washington
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Fault Tree Analysis, an operations research tool used in the aerospace industry, has been adapted qualitatively for use in education. This dissertation describes that adaptation and develops a quantitative method for strategic path (critical path) analysis of fault trees based on consensus of judgments made by well trained and experienced practitioners in vocational education and educational administration.

A fault tree is a logic diagram depicting the logical relationships among specified failure events which have occurred or might occur in a system. Fault Tree Analysis can be viewed as an analytical technique within the framework of a systems approach to problem identification and analysis. A general model of the systems approach to analysis and problem solving is presented for this purpose early in the dissertation.

Demonstration of the qualitative and quantitative use of Fault Tree Analysis in education was accomplished by using a prototype fault tree qualitatively developed in California. Specifically, fault tree construction and analysis based on the prototype fault tree was used to investigate the general undesired event "the potential failure of students trained in Seattle School District's Vocational Education Programs to be employed full time in an entry-level job with possibilities for advancement."

Two major categories of failure events were associated with this undesired event. The first category consisted of those failure events which could be related to *inadequate preparation* and included failure to be prepared adequately due to: (a) inadequate attainment of basic academic skills, (b) inadequate work habits, (c) inadequate career decisions, (d) lack of special skills needed for an entry-level job, and (e) school, home, community, or peer group failures. The second category consisted of those failure events which could be related to reasons *other than preparation* and included failure to be employed due to: (a) lack of availability of entry-level jobs, (b) failure of students to meet general employer requirements, and (c) failure of the student to accept an entry-level job.

Quantification of this fault tree by practicing administrators in Seattle School District No. 1 identified the highest priority sequence of failure events (prime strategic path) contributing to the general undesired event to be in the category of *inadequate preparation*. Within this category of failure event sequences, it was found that school, home, community or peer group failures were the most important. More specifically, this group of failure event sequences identified the value system of the home as unfavorable to preparation for vocational education. The next priority sequence of failure events contributing to inadequate preparation was in inadequate career decisions. This sequence of failure events identified the inability of students to make wise career choices due to an unrealistic view of the world of work primarily based on vicarious experiences. Another high priority sequence of failure events was found to be in basic skills. This failure event sequence focused on the lack of individualized instruction in computational mathematics.

While demonstration of Fault Tree Analysis in this dissertation was in vocational education, it should not be inferred that the use of Fault Tree Analysis in educational systems is limited to vocational education. The fault tree method appears to be easily generalized. For example, the demonstration fault tree includes branches which depict analyses of basic skills, special education, and counseling and guidance, which easily could be developed further and independently of the demonstration fault tree.

Order No. 72-28,672, 273 pages.

33: 2054-A Nov. '72

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Stewart (Last name), Horace (First name), Leon (Middle name)

Exact Title A Study to Determine the Effect of Industrial Technology Experience on the Attitude Changes of Selected University Freshmen

Degree granted Ed. D., Date 1973, No. of pages in report 113

Granted by University of Houston (Name of institution) Houston, Texas (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The problem of the study was to determine the effect of industrial technology experiences on changing the attitudes of Texas Southern University freshmen toward industrial technology generally and toward specific curriculum areas in industrial technology.

The purposes of the study were (1) to determine the effect of the industrial technology curriculum on the attitudes of university freshmen toward industrial technology and specific curriculum areas in industrial technology; and (2) to determine if an attitudinal difference exists in students who were enrolled in industrial arts or vocational education in high school as opposed to those who received no instruction in industrial arts or vocational education in the secondary school.

For the purposes of presenting the findings, the content is arranged in five chapters. The first chapter includes an introduction, statement of the problem, purposes of the study, hypotheses, background and significance of the study, definitions of terms, and basic assumptions and limitations. Chapter II presents a review of the literature with emphasis placed on definitions of attitude, the need for attitude studies, reason for attitude change, pedagogical research of attitudes, studies of attitudes, and, additionally, attitude studies utilizing the Minnesota Teacher Attitude Inventory. Theories of attitude change are also included. Chapter III is concerned with methods and procedures for collecting data and procedures for analysis of the data. The fourth chapter contains an analysis of the data together with the statistical treatment presented in tabular form. Chapter V summarizes the study and presents the findings, conclusions, and recommendations.

The study was restricted to one hundred freshmen technology students who graduated from a secondary school in the spring of 1972 and entered classes at Texas Southern University in the fall of 1972. These students enrolled in automotive technology, building technology, drafting and design technology, electronic technology, metal technology, and graphic arts, and were not previously enrolled in a college or university.

The technique employed in generating data was the "Semantic Differential." The "Semantic Differential" is a rating scale which utilizes a concept measured by several criteria. Each criterion is a pair of polar adjectives located at opposite ends of a continuum, divided into seven equal parts. There are no standard concepts or criterion scales, but for the purpose of the study the concepts are industrial technology, automotive technology, building technology, drafting and design technology, electronic technology, metal technology and graphic arts.

The statistical treatment used in testing the hypotheses was the t test of difference between means and the .05 level was the level of significance upon which the hypotheses were accepted or rejected.

As a result of the study, it was concluded that exposure to the curriculum areas of technology described above does not necessarily induce an attitude change toward these specific curriculum areas. It was concluded that major field of concentration, and enrollment in a secondary industrial arts or vocational education program has little effect upon the attitude change toward the concept of industrial technology. It was also determined that exposure to electronic and drafting as well as design courses did produce a change in attitude toward the concept of electronic technology, and drafting and design technology.

Based upon the findings and conclusions of the study it was recommended that an investigation be made of the specific curriculum areas of industrial technology using all students enrolled in industrial technology courses. It was also recommended that there be special classes for those students who had no secondary industrial arts or vocational education. Even though student scores on the pre- and post-tests did not quite meet the .05 level of significance, it can be discerned that those with secondary school backgrounds in the subject content courses displayed a greater understanding as compared to their peers.

Order No. 73-22,934, 113 pages.

34: 1501-A Oct '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Stillman (Last name), Neil (First name), Jack (Middle name)

Exact Title A Feasibility Study of the Applicability of a Hardware Associative Memory to Computer Graphics

Degree granted Ph. D., Date 1972, No. of pages in report 164

Granted by Syracuse University (Name of institution) Syracuse, New York (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The problem addressed herein is to determine the feasibility of utilizing a hardware associative memory for line drawing applications by implementing a system and comparing it and its extensions with current graphics systems on the basis of speed, storage requirements, and flexibility.

An associative memory, with its word-parallel (simultaneous) access to the entire memory alters the conventional concept of a memory address. In the associative memory information is retrieved by content, not location. Furthermore, an associative memory performs its basic operations and the compare operation in parallel on the entire memory.

A multi-relational data structure for graphical data was developed to exploit the natural properties of an associative memory. It speeds processing while simultaneously reducing storage requirements, and is the foundation of the Associative Processing of Line Drawings (APLD) System. The APLD System contains graphical entities of four types: points, lines, rectangles, and triangles. It provides a self-contained, two-dimensional line drawing capability to process the entities and includes a data management capability to store and retrieve drawings from a library for display, modification, or deletion. In addition, new drawings can be created and stored in the library.

The APLD functions (with the exception of the data management functions) were also written on the TX-2 Computer at M.I.T.'s Lincoln Laboratory under the LEAP Language and Data Structure. A detailed comparison was made between this simulation of an associative memory and APLD in terms of processing time, storage allocation, and flexibility.

The overall conclusion drawn from the experimental results is this: It is feasible to use an associative memory in a line drawing data processing system. Furthermore, the associative memory has been shown to be more than competitive with a triple-based simulation of an associative memory.

The APLD System and its multi-relational data structure simultaneously provide processing speeds which are one to three orders of magnitude faster, and require about one-twelfth the storage required by a triple-based hashed simulation of an associative memory. In some cases, if the simulation can cleverly avoid serial processing, the speed advantage of the APLD System falls to less than one order of magnitude. The storage advantage is, however, unchanged.

Since APLD is, in general, much faster than a triple-based hashed simulation, it will be faster still when compared to a conventional list or ring structured system. However, the triple-based simulation optimized retrieval speed at the expense of storage, and it is therefore not surprising that while APLD has a storage advantage of over 1200% when compared to a triple-based simulation, it only maintains an advantage of over 400% when compared with the conventional systems.

The flexibility of the APLD System further increases its speed advantage. The multi-relational data structure implicitly stores ALL possible relations among ALL properties of an entity, making the servicing of a complex query comparatively simple in the associative memory. The data can be interrogated on any of the relations, or on any combination of the relations, with absolutely no change to the data structure. In the case of a triple-based simulation, on the other hand, the more complex the request, the more serial searching and/or list intersection will be required, increasing proportionally the processing advantage of the associative memory. A bonus derived from this fact is the simplicity of programming a parallel machine. Since so much can be accomplished in one instruction, an associative memory is extremely compact, and its logic is quite apparent.

Finally, it was found that a line drawing capability does not require an associative processor, i.e., if creating line drawings but not processing them, is the object of the system, an associative memory would be sufficient. However, if processing functions such as scaling, translation, rotation, etc., are required, then an associative processor would be advantageous.

Order No. 73-7778, 164 pages.

(33: 4372-B) March '73'

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Sulentic, Milo, Norman
(Last name) (First name) (Middle name)

Exact Title Validation of the Minnesota Vocational Interest Inventory for Selection of Male Vocational-Industrial Instructors for Minnesota Area Vocational-Technical Institutes

Degree granted Ph. D., Date 1973, No. of pages in report 73

Granted by University of Minnesota Minneapolis, Minnesota
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The primary purpose of this study was to develop a scoring key of the Minnesota Vocational Interest Inventory which could be used in the selection of tradesmen who might become vocational-industrial teachers in Minnesota Area Vocational-Technical Institutes.

The M.V.I.I. was administered to 86 male teachers of trade subjects employed by ten Minnesota Area Vocational-Technical Institutes. An item analysis was made of their responses to the triad format of the M.V.I.I. and each response was compared with the responses of a tradesmen in general group (T.I.G.). The T.I.G. group numbered two hundred forty and was composed of workers from sixteen different occupations.

The items with the larger percentages of difference between the teachers and tradesmen in general group, were selected as items for the scoring key.

A randomly selected group of twenty-nine teachers of trade subjects, one hundred four employed plumbers, and thirty-nine employed bricklayers (none of whom were used in the development of the scoring key) were then tested and scored (cross validation process) with the developed key to see if the distribution of scores for the teachers was significantly different from the scores of each of the two tradesmen groups.

The mean and standard deviation for each group, and percentage of overlap between the distribution of the teacher group and each of the trade worker groups were calculated. The percentage of overlap statistic, developed by Tilton,[1] was used to estimate the number of persons per hundred in a distribution whose scores can be matched by scores in another distribution. The percent of overlap was calculated between teachers of trade subjects and plumbers and between teachers of trade subjects and bricklayers.

The results indicate that the interest patterns of teachers of trade subjects are somewhat different from plumbers and bricklayers. Percent overlaps were about 69% and 73%, respectively. Although not very great, such differences can be measured by a special scoring key of the Minnesota Vocational Interest Inventory. This difference in interest patterns, revealed by the fact that the overlaps were not 100%, may be used by vocational school administrators to help in the selection of tradesmen for possible teaching positions.

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[1] J. W. Tilton, "The Measurement of Overlapping," The Journal of Educational Psychology, Vol. 28, No. 9 (December, 1937), pp. 656-662.

Order No. 73-25,663, 73 pages.

34: 2480-A Nov '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Sunnarborg (Last name), Thomas (First name), Ronald (Middle name)

Exact Title The Feasibility of Implementing a Career Education Program Within The Division of Business and Industry at Bemidji State College

Degree granted Ed. D., Date 1972, No. of pages in report 206

Granted by University of Minnesota (Name of institution) Minneapolis, Minnesota (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The Problem

The problem of this study was to determine the feasibility of implementing a career education program within the Division of Business and Industry teacher preparation program at Bemidji State College.

The Method

A review of the literature was completed to develop an operational definition of career education so that a communication base could be formed with the personnel within the Division of Business and Industry at Bemidji State College. This review of literature also served to provide the background necessary to develop a career education packet to be distributed to specific faculty members.

An interview was held with the Business and Industry Division Head to explain the purposes of the study, at which time an endorsement for the study was received. The faculty members to be involved in the study were selected by the Division Head and Department Chairmen. These four faculty members were each given a career education information packet. This packet served as the source from which to develop Q-Sort statements that were administered to assess whether a common understanding of the career education concept was present.

Personal interviews were then held with the four selected faculty members to determine the amount of interest, support, and need for a career education program at Bemidji State College. Resource searches were conducted to determine the present resources available for a career education program and these were compared with the materials available within an ideal career education resource center. The costs of implementing a career education program were determined and these costs were compared to the fiscal resources available.

CONCLUSIONS

The following conclusions are evident as a result of this study: 1. Presently there are four faculty members within the Division of Business and Industry who have a common communication base on which to develop a career education program. 2. Presently there is not an adequate amount of multi-media materials available for the implementation of a career education program at the undergraduate level. 3. There is faculty interest, support, and a felt need for a career education program within the undergraduate program at Bemidji State College. 4. A career education program within the Division of Business and Industry at Bemidji State College would be a realistic and acceptable goal.

RECOMMENDATIONS

1. A career education program should be implemented within the Division of Business and Industry to fill the void of no guidance and counseling or occupational information exposure in the teacher preparation program. 2. An introductory or basic career education course should be developed that would be required of all teacher education majors during their junior year. 3. A follow-up unit of two weeks duration should be included in an existing professional course within the major areas of Business Education and Industrial Education on the topic of career education. 4. Faculty teaching assignments should be organized to facilitate the teaching of two 3 credit career education courses during the regular school year. 5. Consideration should be given for allocating $7,000 for the acquisition of career education multi-media materials and equipment. 6. All existing career education materials on the campus of Bemidji State College should be stored, catalogued, and disseminated through a resource center. 7. The Division of Business and Industry should purchase multi-media career education materials whether or not a career education program is formally implemented. 8. If implemented, publicity should be given so that the materials will be utilized by schools in the immediate geographic area.

Order No. 73-992, 206 pages.

33: 3472-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Takis, John, Paul
(Last name) (First name) (Middle name)

Exact Title A Survey of Differentiated Staffing in Industrial Education

Degree granted Ed. D., Date 1972, No. of pages in report 422

Granted by Wayne State University Detroit, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of the Study

The purpose of this study was to identify, examine, compare, and categorize some of the existing and proposed models or plans of differentiated staffing at the secondary school level, including the industrial education staff in the few schools where such staff has been differentiated. Further, such identification, examination, comparison, and categorization was planned to fulfill the need for (1) guidelines for experimentation in differentiated staffing in secondary school industrial education departments, (2) a basis upon which a teacher might make an identification of his possible role in a differentiated staff arrangement, (3) a basis for comparison of the various proposed or existing models, and (4) knowledge of current trends in school staffing arrangements.

Methodology of the Study

The procedural plan to achieve the objectives of the study was to (1) review the literature related to differentiated staffing, and (2) develop, validate, and administer survey instruments to gather data about differentiated staffing practices at the secondary level.

Two survey instruments were developed. Survey Instrument No. 1 asked for general information about experiences and developments with respect to new staffing arrangements, and it was forwarded to administrators at 101 schools identified as possibly meeting the criteria for selection. From 82 responses, forty schools met the criteria and became the total population of the study. Instrument No. 1 also elicited the names of industrial educators eligible and willing to participate in the study. A total of 17 schools were identified as having differentiated staffing in the industrial education program. Survey Instrument No. 2, developed to gather specific information about the industrial education staff's involvement in differentiated staffing, was sent to these 17 schools. All responded and these 17 schools comprise the population for Instrument No. 2. Basically, both instruments asked for information in the following categories: (1) General Background Information, (2) Implementation of Differentiated Staffing and Training of Staff, (3) Professional and Non-Professional Roles and the Instructional Situation, (4) Evaluation and Accountability, and (5) Negotiations, Contract Provisions, Salary Considerations, and Contractual Periods. The instruments were validated by a jury of six nationally recognized authorities in the field of differentiated staffing.

The Exegesis of the Study

This study gathered information to report the state of the art, both as it applied generally to education and as it applied specifically to industrial education. The data and findings presented in the study were evidence in support of the stated objectives.

Some of the more significant findings were:

1. It was evident that differentiated staffing provides a framework which facilitates extensive involvement in innovative education practices.
2. To insure the successful implementation of a differentiated staff arrangement, it is necessary to train the staff to specifically meet the needs and objectives of a differentiated staff program.
3. Job descriptions for the various levels of professional and non-professional personnel are essential for a trouble-free differentiated staffing program.
4. Differentiated staffing programs do an effective job of relieving teachers from many non-teaching duties.
5. The criteria for promoting professional personnel in a differentiated staff arrangement appeared to be rather traditional, with only a few exceptions.
6. Job security for the non-professionals was practically non-existent, except in a few cases where seniority or tenure applied.
7. It was evident that differentiated staffing was being implemented mainly in rural and suburban areas.
8. Flexible scheduling was utilized by a majority (57 percent) of the schools identified as being involved in differentiated staffing.
9. Large-group instruction to teach the commonalities of industrial education was used by more than 75 percent of the identified schools.
10. Some form of team teaching was utilized by 70 percent of the schools in their industrial education programs.
11. A change in the evaluation of the services of teachers occurred under differentiated staffing; specifically, in 40 percent of the responding schools, peers were involved in teacher evaluation.
12. The five most important reasons for implementing differentiated staffing were to:
    a. Provide more flexibility in the use of teacher time.
    b. Facilitate individualized instruction.
    c. Improve response to individual needs of students.
    d. Make more efficient use of teacher time.
    e. Involve teachers more in decision making.

Order No. 72-28,495, 422 pages.

33: 2143-A Nov. '72'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author	Talbott	Laurence	Fletcher
	(Last name)	(First name)	(Middle name)

Exact Title The Development of Four-year Programs Designated Industrial Technology by Colleges and Universities in the United States to 1971

Degree granted Ed. D., Date 1973 No. of pages in report 183

Granted by	Utah State University	Logan, Utah
	(Name of institution)	(City, State)

Where Available: Microfilm (X) Microfiche ( ) E.R.I.C. ( )

Purpose of Study: To compile a comprehensive, accurate, documented history of baccalaureate level programs bearing the title, "Industrial Technology", that have been offered by colleges and universities in the United States, in order to provide industrial technology education with identity and continuity.

Source of data and method of study: Personal interviews and correspondence with leaders in the field, data from colleges and universities offering programs designated as industrial technology, and the historical files of the National Association of Industrial Technology were primary sources. The data was then analyzed and put into chronological order.

Findings and Conclusions: The study identified four eras of development for industrial technology education.

1912-1950 - Nine baccalaureate level degree programs came into being to meet local industrial needs and the needs of students.

1950-1960 - New materials, techniques and management methods created a need for industrial technology graduates. This need was further increased when skill and management courses were phased from engineering curriculum to make room for more mathematics and science courses. Industrial technology education grew principally from industrial arts departments that seized the initiative in fulfilling this need.

1960-1965 - Development was brought about by random growth of industrial technology on a large scale. The search for definition that took place found diverse and conflicting ideas about industrial technology had developed. Two types of programs emerged, general and specialized. The "general" type, the most common, was concerned with production and management and was not engineering oriented. The "specialized" type of program stressed technical training in specific fields, and some leaders included engineering technology education in this category.

1965-1970 - During this period, the National Association of Industrial Technology was organized to provide definition and objectives and become an accrediting agency for industrial technology programs.

Industrial technology has not been a precise term which described a specific element of industrial education, but a generic term that could mean any type of technical education. Industrial technology as a field of employment will be unable to gain recognition and understanding until it eliminates its incursion into technician training and emphasizes its early role of providing understanding of the technology of industry as a whole along with business and communication skills.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Tate, Joel, Clift
(Last name) (First name) (Middle name)

Exact Title A Comparative Study of Transfer and Occupational-Technical Students Enrolled in Community College Social Science Courses.

Degree granted Ph. D., Date 1972, No. of pages in report 196

Granted by George Peabody College for Teachers
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purposes

The major purposes of this investigation were to determine the similarities and differences of transfer and occupational-technical community college students with respect to selected background, aptitude, interest, attitudinal, and motivational criteria, and to identify the extent to which certain of these factors predict academic success in social science courses for the two student groups.

Sample

The sample consisted of 360 students selected from social science classes at three comprehensive community colleges in the state of Virginia (181 occupational-technical students and 179 transfer students).

Research Methodology

The research for this investigation was conducted during the 1970-71 academic year using data from the *Comparative Guidance and Placement Test*, the Allport, Vernon, and Lindzey *Study of Values*, the *Stanford Achievement Test: High School Social Studies Battery, Form X*, and a self-developed student background questionnaire. Statistical techniques testing eight null hypotheses included:

1. A comparison of mean scores on selected aptitude, motivation, interest, value, and achievement tests using a "t" test for a difference between independent means.
2. Computations of several multiple regression analyses for the purpose of predicting the criterion variable (grades earned in social science courses) from a set of twelve possible predictor variables.
3. X^2 analyses of socioeconomic background factors using a weighted composite of occupational, educational, and income criteria. In each phase of the data analysis, the .05 level of confidence was employed as the standard in evaluating the significance of obtained differences and in testing the power of the prediction equations.

Summary of Findings

The findings of this investigation revealed that transfer students enrolled in community college social science courses differ from occupational-technical students enrolled in this curriculum area in the following ways:

1. Although the socioeconomic status indicators failed to discriminate between the two student groups, the additional biographic factors of age and attitude toward social science courses did reveal significant differences. In the 21-or-over age group, there were proportionally more occupational-technical students represented. On the attitude scale related to opinion of courses in the social science area more transfer students were represented on the positive side, although the difference that emerged did so within an overall positive attitude for both groups.
2. Transfer students scored significantly higher than occupational-technical students on the scales measuring reading ability, verbal ability, and mathematical ability and achievement.
3. Transfer students scored significantly higher on the aesthetic values scale.
4. Occupational-technical students scored significantly higher on the economic values scale.
5. Transfer students scored significantly higher than occupational-technical students in general social science achievement and understanding.
6. Transfer students scored significantly higher than occupational-technical students on a scale measuring interest in the social sciences.

The portion of the data analysis concerned with the prediction of academic success in social science courses for transfer and occupational-technical students revealed the following general findings:

1. For the total group of students, only six of the twelve predictor variables had a significant correlation with the grade a community college student earned in a social science course. The predictor variables having low to moderate correlation with the criterion were: verbal ability, reading ability, academic motivation, social science interest, political values, and social science achievement. All of these correlations with the criterion were positive except that of political values.
2. The stepwise and multiple regression techniques showed that the combined battery of predictive instruments did have a significant correlation with the grade a student earned in a social science course. However, the size of the error terms seriously questions the efficiency and utility of employing a regression equation composed of these predictors for the purpose of determining expected grades in social science courses.
3. The largest proportion of criterion variance was associated with scores on the verbal ability measure. In all computations of the regression equations for the total group, or for the transfer and occupational-technical groups considered separately, the proportion of criterion variance was not increased more than one per cent by the addition of more than six of the most efficient predictor variables. In no case was the total proportion of criterion variance explained by the predictors in different combinations more than one-third. Therefore, at least two-thirds of the variance in grades earned in social science courses was not accounted for by this set of predictor variables.

Order No. 72-25,406, 196 pages.

33: 1467-A Oct. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Taylor (Last name), Henry (First name), Theodore (Middle name)

Exact Title The Effectiveness of a Laboratory and Multi-Media Instruction Technique as Compared to the Conventional Lecture-Demonstration Method of Teaching Carburetion to Tenth Grade Students

Degree granted Ph. D., Date 1973, No. of pages in report 170

Granted by The University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to determine the effectiveness of a laboratory and multi-media instruction technique as compared to the conventional lecture-demonstration method of teaching carburetion to tenth grade students. In connection with this study the researcher sought an answer to the following question: which group of students will learn more about carburetion fundamentals, carburetor overhaul, and servicing, those who participated in the laboratory multi-media instruction technique, or those who learned through the conventional lecture-demonstration method?

To answer this question the writer tested the following hypotheses:

Hypothesis 1: There is no significant difference in terms of achievement of knowledge between students who are taught carburetion through the use of a laboratory and multi-media instruction technique and the achievement of knowledge of students taught by the conventional lecture-demonstration method.

Hypothesis 2: There is no significant difference in terms of performance skill between students who are taught carburetion through the use of a laboratory and multi-media instruction technique and those students taught by the conventional lecture-demonstration method.

Hypothesis 3: There is no significant relationship between the achievement of knowledge and the performance skill within the control and the experimental groups.

Hypothesis 4: There is no significant relationship between achievement of students in both the control and experimental groups and each of the following characteristics: work experience, attitude, time given by the teacher to answer students' questions, race, and reason for selecting this course.

Hypothesis 5: There is no significant relationship between the performance skill of students in both the control and experimental groups and each of the following characteristics: work experience, attitude, time given by the teacher to answer students' questions, race, and reason for selecting this course.

The study involved tenth grade students enrolled in automotive laboratory settings of four regional vocational-technical schools in the State of Connecticut. These four schools were randomly chosen from the seven regional vocational-technical schools who volunteered to cooperate in this study. The first two schools were combined to form an experimental group (n = 40) and schools three and four were combined as a control group (n = 46). The three remaining schools formed a test development group (n = 66).

The researcher with the assistance of a panel of judges developed an achievement pre- and posttest, a performance skill test, and a student questionnaire for the purpose of collecting data for the study. A series of TV lessons on carburetor overhaul and servicing were specially designed by the researcher for the students of the experimental group.

The data consisted of students' scores to an achievement test, a performance test, and the student questionnaire.

A reliability coefficient of .89 for the achievement test was determined through the use of the Kuder Richardson Formula #20. None of the variables investigated, including the experimental method, had any significant effect on gain in the students' achievement test scores (experimental and control group). The following variables were significant in determining the students performance on the skill test: work experience of the student, the multi-media technique of teaching, and the time given by the teacher to answer students' questions. The t-value for the work variable was significant beyond the .05 level of confidence. The laboratory multi-media technique of instruction was found to be significantly superior to the conventional lecture-demonstration method in producing a performance capability of students in carburetor servicing skills. A t-value indicated a significant difference beyond the .01 level of confidence between the students of the experimental and the control groups. The Pearson Product Moment Correlation was employed to determine the relationship between the performance test and the achievement test posttest scores of the experimental and the control groups, and of all the students together. The value of 0.30 was significant at the .05 level for the experimental group. The values for the control group and for all the students taken together were found to be small in comparison to the values of the experimental group, and were not significant.

Students who responded (in the student questionnaire) that sufficient time was given by the teacher to answer their questions relevant to carburetion performed better than students who claimed there was insufficient time. The t-value for the time variable was found to be significant beyond the .01 level. For students instructed using the multi-media technique, subject mastery as measured by an achievement test and performance test are significantly positively related.

According to the data collected and analyzed for the purpose of this study the following conclusions are presented:

1. This study showed evidence that teaching tenth grade students carburetion fundamentals, carburetor overhaul, and servicing via a laboratory multi-media technique was more effective in improving the performance skill than the conventional lecture-demonstration method of instruction.
2. The evidence does not indicate in any way that multi-media will result in improved knowledge about carburetion.
3. Both methods, the laboratory multi-media and conventional lecture-demonstration, of teaching carburetion were highly effective in terms of student achievement. This conclusion is supported by the findings of significant difference between the pre- and posttest in both the control and experimental groups.
4. Students who received immediate assistance from their teacher during the course did significantly better in the performance skill test than those who did not receive aid.

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34: 1787-A Oct '73

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Taylor (Last name), Paul (First name), George (Middle name)

Exact Title Job Description and Employee Needs Related to Satisfaction and Satisfactoriness of Teachers

Degree granted Ph. D., Date 1971, No. of pages in report 58

Granted by University of Connecticut (Name of institution) Storrs, Connecticut (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purposes of this study were to (1) analyze the job description and employee needs as they related to the satisfaction and satisfactoriness of teachers of Adult Basic Education (ABE) in ten selected ABE programs in the State of Connecticut; (2) generate an Occupational Reinforcer Pattern (ORP) for teachers of ABE and (3) formulate selection criteria for teachers of ABE.

Propositions of the Theory of Work Adjustment of the Minnesota Studies in Vocational Rehabilitation served as the research framework for the study. The Theory of Work Adjustment hypothesizes that satisfaction and satisfactoriness in work may be explained through the principle of work environment - individual needs correspondence. The method of examining this correspondence requires a description of the reinforcement values of the work environment and measures of an individual's set of needs, his general job satisfaction and the degree of his satisfactoriness. The dimensions of reinforcement, need and satisfaction measured in this study were ability utilization, achievement, activity, advancement, authority, company policies and practices, compensation, co-workers, creativity, independence, moral values, recognition, responsibility, security, social service, social status, supervision - human relations, supervision - technical, variety and working conditions. The instrumentation for the Theory of Work Adjustment, the Minnesota Job Description Questionnaire (MJDQ), the Minnesota Importance Questionnaire (MIQ) and the Minnesota Satisfaction Questionnaire (MSQ), provided the measures for this set of dimensions. The degree of satisfactoriness was obtained by means of interviews with ABE directors who were requested to make decisions regarding the retention and reward prospects of their faculties.

The study was structured in five phases: phase I consisted of administering the MJDQ at two ABE summer institutes for directors of ABE programs (N = 48), the results of which generated the ORP for Teacher, Adult Basic Education; phase II consisted of administering the MIQ to the teachers in ten selected ABE programs in Connecticut (N = 107) to obtain measures of individual needs; phase III consisted of administering the MSQ to the teachers who had completed the MIQ's to provide the measure of general satisfaction; phase IV consisted of obtaining the indication of satisfactoriness for the teachers who had completed MIQ's (N = 107) and MSQ's (N = 99) and phase V comprised the statistical analysis of the data.

Results of the study were as follows: (1) An ORP for Teacher, Adult Basic Education was generated; (2) No significant relationship was found for satisfaction as a function of the correspondence between the reinforcer system of the work environment and the individuals' needs; (3) General job satisfaction was found to be relatively high for the total group of ABE teachers; (4) Statistically significant R's were computed by Multiple-Regression Prediction analyses for MIQ scale scores and general satisfaction scores. These results inferred that the significant reinforcers for teachers of ABE are to be found in the satisfaction of 14 of the 20 scales studied (Supervision - Technical, Recognition, Co-workers, Achievement, Authority, Responsibility, Ability Utilization, Creativity, Social Service, Activity, Variety, Compensation, Independence and Supervision - Human Relations) and (5) Satisfactoriness, as measured in the study, was not significant as a moderator for either potential or actual satisfaction.

Recommendations for further study were indicated.

Order No. 71-29,916, 58 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Thompson (Last name), Randall (First name), Lyle (Middle name)

Exact Title The Labor Market for Illinois Community College Occupational Instructors

Degree granted Ed. D., Date 1972, No. of pages in report 293

Granted by University of Illinois at Urbana (Name of institution) Champaign, Illinois (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this exploratory study was to investigate the labor market characteristics of Illinois community college occupational instructors.

The need for this research was precipitated by the lack of available information describing the community college labor market. The lack of data has hampered administrators, teacher educators, and other leaders in making rational decisions concerning staffing of occupational education at the community college level.

A mail questionnaire was used to collect data from a stratified random sample of approximately 40 percent of the full-time instructors in all occupational areas who were identified in 45 Illinois public community colleges. A total of 276 usable returns were received which constituted a return rate of 65 percent.

Six principal questions were investigated:

1. What are the major sources from which community college occupational instructors are employed?
2. What methods have community college occupational instructors used in looking for jobs and how did they first learn of these jobs?
3. What factors have induced community college occupational instructors working in a previous job to leave and choose their current job?
4. From what geographic areas have community college occupational instructors been recruited? Where have they lived, and where were they born?
5. How have community college occupational instructors obtained the occupational and educational competencies required for their teaching field?
6. What are the general characteristics of community college occupational instructors?

The four major sources of occupational instructors were, in rank order: (1) education, (2) business and industry, (3) graduate schools, and (4) housewives. A majority of those instructors who previously were employed in education came from the secondary level.

The occupational instructors were well prepared as measured by formal education degrees. Approximately 57 percent entered community college teaching with at least a master's degree. There was a strong tendency for the instructors to continue their education and in particular for those with the bachelor's degrees to continue on for graduate credit and master's degrees. Approximately one-third were currently taking courses and 20 percent expect to obtain the doctorate.

The two major reasons given by the occupational instructors for taking their current jobs were, in rank order: (1) challenging job, (2) increase in salary. The two most important reasons given for leaving their previous jobs were in rank order: (1) opportunity for advancement, (2) opportunity for advancement limited.

The average occupational instructor could be stereotyped as a thirty-nine year old Caucasian male or female whose father was a blue-collar worker. There was a very high incidence of occupational, educational, and geographic state of Illinois inbreeding. The occupational instructors were immobile geographically but were to some extent mobile ocupationally as evidenced by a majority who entered full-time community college teaching in their third, fourth, or fifth career sequence step.

The two techniques most often used by the occupational instructors in looking for their current job were, in rank order: (1) direct personal application, (2) "did nothing and was recruited." The two most often cited methods by which the instructors first learned of their current position were: (1) "a friend at the institution," (2) "did nothing and was recruited." Friends, relatives, co-workers, and a friend from the institution, were very effective job search techniques as measured by an effectiveness index used in the study.

The major implication of the study was that there needs to be particular attention given to long-term staff recruitment and development by 4-year colleges and universities, state agencies, the federal government, business and industry, and/or the community colleges themselves.

Order No. 73-17,447, 293 pages.

34: 682-A Aug '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Thorne (Last name), Edward (First name), H., III (Middle name)

Exact Title An Evaluative Study of an Industrial Training Program to Prepare The Hard-Core Unemployed for Industrial Occupations

Degree granted Ed. D., Date 1972, No. of pages in report 202

Granted by Boston University, School of Education (Name of institution) Boston, Massachusetts, (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Problem: The problem was to analyze and evaluate various operational aspects of a specific hard-core unemployed training program (ST/EP: Skills Training and Education Program, General Electric Company, Lynn, Massachusetts), and to set up a model basic to continuing program evaluation.

Scope and limitations of the study:

1. Study was limited to effectiveness of ST/EP in terms of Black trainee of performance.
2. Primary concerns were the more tangible aspects of performance such as improvements in retention, absenteeism, tardiness, upward mobility, and such criteria of employability as output, reliability, and ability.
3. Trainee viewpoint was derived through informal interview of fifteen program graduates.
4. No attempt was made to examine what effect the program may have had on program or post-program dropouts.
5. Few graduates expressed satisfaction with the program. Evaluation was in terms of too easy, permissive, unresponsive to trainee interests and needs, too short and too shallow.
6. The program climate was felt by some graduates, to have been less democratic than the climate experienced in post-ST/EP shop employment.

Implications:

1. Trainee feelings that individual interests and needs were not being recognized or met indicated a need for program revision in the direction of closer adherence to andragogical principles and process.
2. The indication that upward mobility is impaired rather than enhanced by program training suggested the need for curriculum review, evaluation, and revision.
3. Permissiveness, easy assignments, and early graduation were not perceived by the hard-core trainee to be satisfactory program criteria. Programs should be challenging and have strong face validity.
4. Upward mobility of trainees could be improved by providing more professional and adequate counseling.
5. Since trainees felt that co-employees viewed them as being different, the Hawthorne effect might be employed to excite various types of performance improvement.
6. ST/EP-graduate disenchantment with job assignments indicated the need for program design to include placement on meaningful jobs with the assurance of at least peer-equal upward mobility.
7. The ST/EP image might be enhanced by graduating only the prepared to floor jobs.
8. Trainees appeared to be best motivated by immediately-applicable learning; hence, program emphasis might best be shifted to skills training.
9. Training programs should be continually self-analyzing, evaluating and modifying if the diverse and everchanging needs of the hard-core unemployed are to be met.

Procedure and methodology: Records of three groups of entry-le employees, ST/EP graduates, Black non-ST/EP subemployed, and white (expected shop performance) were extracted from payroll and employment office files and subsequently compared in terms of several measures of employability—attrition, absenteeism, tardiness, and upward mobility. Null hypotheses were tested to indicate significance-levels of relationships.

Less statistically-substantiated indicators of employability such as reliability, output, and ability, were subjected to foreman appraisal. Ranking (card stacking) and forced distribution were employed.

The trainee viewpoint was obtained through extensive informal interviews between Black administrators and ST/EP graduates after an apparent trust level had been achieved. Interviews were guided by prepared questionnaires.

Major findings: ST/EP-graduate performance, although in some cases somewhat improved over-ST/EP subemployed performance, failed to approximate white entry-level performance (shop expectancy).

A primary ST/EP target, upward mobility was found to be negatively related to ST/EP training. A longitudinal study indicated that non-ST/EP subemployed started at higher rates than ST/EP trainees, and remained at higher rates. White upward mobility was found to be significantly higher than that of either subemployed group.

ST/EP-graduates' evaluations of the program included the following observations:

1. ST/EP training tended to label the graduate as "one of the bad guys."
2. Counseling appeared to be somewhat unprofessional, too little, and too late—frequently, post facto.
3. ST/EP graduates perceived themselves as being considered different than other employees.
4. Post-ST/EP job assignments were felt to be beneath the dignity and ability levels of the graduate.

Order No. 72-25,473, 202 pages.

33: 1479-A Oct. 72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Timper (Last name), Hans (First name), Edward (Middle name)

Exact Title Characteristics of Selected Industrial Education Teachers in Relationship to Barriers to Curriculum Change

Degree granted Ed. D., Date 1972, No. of pages in report 124

Granted by Utah State University (Name of institution) Logan, Utah (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Problem

Curriculum change in education is not easily implemented. When the implementation of curriculum change is not successful, it is safe to assume that there are barriers or obstacles to its acceptance. At the core of such barriers to curriculum change would seem to be the individual teacher who is expected to implement curriculum change. The purpose of this study was to analyze data pertaining to selected characteristics of industrial education teachers and to relate this data to barriers to curriculum change.

Procedure

Research instruments were sent to 300 randomly selected industrial education teachers at the public high school level (grades 7-12) in the four corner states of Arizona, Colorado, New Mexico, and Utah. The teachers completed a demographic data sheet, and short forms of Swanson's Inventory on Viewpoints on Education and Dempsey's Barriers to Curriculum Change Questionnaire.

The statistical technique which was utilized to establish a model for the prediction of a profile of the industrial education teacher who is resistant to curriculum change was stepwise multiple regression.

Findings

The industrial education teacher who is resistant to curriculum change has the following characteristics as established by the model.

1. The resistant teacher is divorced, separated, or widowed. Also, the single teacher is more inclined to be resistant than the married teacher. 2. The resistant teacher has a minimum amount of professional preparation. 3. The resistant teacher has a minimal amount of occupational (trade) experience. 4. The resistant teacher has been employed in a large number of school systems. 5. The resistant teacher has a majority of his teaching experience at other than the junior high or senior high school levels. Also, the senior high school teacher is more resistant than the junior high school teacher. 6. The resistant teacher actively seeks out outdoor activities. 7. The resistant teacher has a low annual teaching income. 8. The resistant teacher has a high annual total income.

Order No. 73-955, 124 pages.

33: 3349-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Todd (Last name), John (First name), David (Middle name)

Exact Title Relationships Among Selected Occupational Experience Programs in Secondary Schools

Degree Granted Ed. D., Date 1972, No. of pages in report 153

Granted by University of Illinois (Name of institution) Urbana, Illinois (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose: The primary purpose of the study was to determine differences and relationships among different patterns for occupational experience. Similar differences among other factors, such as enrollment of pupils by different vocational fields, number of years enrolled in vocational courses, size of community where the pupils resided, sex, and occupational objectives of the pupils were also studied.

Method: The study included 250 pupils selected as a stratified random sample of 50 pupils from each of five vocational fields. The sample consisted of five pupils from ten programs in each of the vocational fields.

Differences and relationships which existed were determined in relation to job satisfaction, school attendance, school achievement, and attitude toward preparation for the world of work. Data were collected by administering Hoppock's Job Satisfaction Blank, attitudinal inventory toward preparation for the world of work, a questionnaire, and from official school records. The vocational teachers administered the inventories.

The data were treated with a one-way analysis of variance and a t-test when appropriate. Correlations were determined by Pearson's product-moment coefficients. The Mann Whitney U test was used to determine differences between the two groups that were combined.

Findings

1. The instruments used in the study had sufficient reliability. The reliability coefficient was greater than .80 for both methods used to test the attitudinal instrument. The Hoppock Job Satisfaction Blank had a reliability coefficient of .93.

2. Pupils who had received different occupational experiences did not differ significantly in relation to school achievement and attendance, job satisfaction, and attitude toward preparation for the world of work. Differences did exist with attitudinal statements that dealt primarily with relevancy of courses toward preparing for employment and occupational choices. Pupils who had obtained cooperative experiences gave the most unfavorable responses and differed significantly from most of the other patterns.

3. There was a significant correlation between job satisfaction and attitude toward preparation for the world of work. These two variables were also correlated for pupils who had cooperative and school laboratory occupational experiences. The correlation was higher for the pupils who had obtained school laboratory experiences.

4. There were significant differences in job satisfaction, school attendance and attitude toward preparation for the world of work among the pupils according to their enrollment in different vocational fields. These differences did not follow a consistent pattern but those in occupational home economics showed the greatest improvement in school attendance and had the most favorable attitude toward preparation for the world of work. Pupils in vocational office education had the best job satisfaction with their occupational experiences.

5. Pupils who resided in large metropolitan areas had a more unfavorable attitude toward preparation for the world of work than those who lived in smaller communities. Their difference in attitude was significant.

6. Pupils grouped according to their occupational objectives did not differ significantly in relation to any of the variables tested.

7. The female pupils differed significantly from the males in their improvement in attendance and attitude toward preparation for the world of work.

8. Pupils enrolled in their first year in vocational education did not have as favorable of an attitude toward preparing for the world of work as those who had been enrolled for two, three, or four years. This difference was significant.

Order No. 73-10,069, 153 pages.

33: 5629-A April '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Trudeau (Last name), Terence (First name), J. (Middle name)

Exact Title A Component-Controlled Cooperative Work Education Program Utilizing a Computer-Based Component Selection System Applied to Baccalaureate Level Industrial Technology Programs.

Degree granted Ph. D., Date 1972, No. of pages in report 242

Granted by Bowling Green State University (Name of institution) Bowling Green, Ohio (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

A major task facing administrators of higher education is that of providing appropriate educational content via effective instructional techniques. This task is compounded by the information explosion permeating our society making education within the confines of the university campus increasingly difficult.

This study was conducted to identify a model of field-based student experiences as a discrete segment of an on-campus baccalaureate program. The specific off-campus model developed was a cooperative work education (CWE) program in industrial technology. Included was a computer-based component selection system to efficiently select and schedule students for individually required experiences within the context of the model.

A research questionnaire was employed in developing the model and consisted of tasks an industrial technologist might perform. A Likert-type rating scale, having five alternate responses, was utilized so that respondents could rate each task item. A three-step process was executed in the treatment of the response data which resulted in a definitive, widely applicable and viable curriculum model. This process involved calculations of means, two-way classification analysis of variance, and one-way classification analysis of variance to account for variables inherent within and between the respondent groups.

A high rejection rate of task items was apparent. Conclusions reached were: (1) The industrial respondent group was less inclined to accept the broad capabilities and subsequent function of the industrial technologists as did the educators. (2) There existed relatively greater diversity among the industrial respondents regarding the function of industrial technologists than was evident within the education group. (3) Much disagreement regarding industrial technologists' functions existed between the industrialists and the educators responding to the research instrument.

The notion of developing a definitive, verbal curriculum model is educationally sound in that it identifies detailed content. Concomitant with this, the use of a computer-based selection system guarantees that individual student needs will be efficiently met relative to the structured model. Thus individualization of instruction can occur within the context of a clearly defined curriculum. Order No. 73-12,028, 242 pages.

33: 6038-A May '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Tryon, Vernon, Arthur
(Last name) (First name) (Middle name)

Exact Title The Economic and Psychological Aspects of Production

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 270

Granted by University of Maryland College Park, Maryland
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The problem of the investigation was to secure answers to questions about the human aspects of the production function of the American economy and to draw generalizations which could provide industrial arts curriculum content. Information was obtained from a study of selected areas of the literature of economics and industrial social psychology. The investigation was premised on the assumptions that industrial arts curricula should be based upon a study of the industrial aspects of the culture, that production is the central function of industry, that the human (in comparison with the technological) elements of industry are deserving of increased attention by industrial arts, and that the human element has been most thoroughly studied by the disciplines of economics and industrial social psychology.

The economics questions to be answered by the study explored the mechanisms governing production in a price-controlled exchange economy, the factors regulating the mix and quantity of productive output, the theoretical explanation of the dynamics of production, and the factors regulating the mix and quantity of available productive services. Industrial social psychology questions were concerned with the formation and characteristics of both formal and informal work groups, how work groups function within production organizations, the relationships between individual workers and work groups, and the kinds and characteristics of supervision of work groups.

The study of economics was limited to that area known as microeconomics and included the marketplace behavior, interactions, and relationships of products, prices, productive services and the aggregates; businesses and households. The study was facilitated by making several simplifying assumptions which had the effect of controlling some of the economic variables and thus exposing for study some of the fundamental mechanisms of the price-directed economy.

The study of industrial social psychology was concerned with the social and psychological influences and interactions which affect workers in the production function of the economy. The dynamics of both the formal and informal aspects of work groups were studied as well as the place of the individual worker in relation to work groups. Participation and supervision of workers were also included in the investigation.

The findings from the literature of the two disciplines were condensed to their essentials, were stated in the form of generalized conceptual statements, and were certified as accurate in factual content by professors of the two disciplines at several universities of the Northeast. The generalizations were finally ranked by seven industrial arts educators in terms of their importance to industrial arts curriculum content.

Order No. 72-28,916, 270 pages.

33: 2144-A Nov. '72'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Turner, William, Gene
(Last name) (First name) (Middle name)

Exact Title Attitudes of Undergraduate Industrial Education Students Toward Selected Safety Concepts

Degree granted Ed. D., Date 1973, No. of pages in report 176

Granted by Arizona State University Tempe, Arizona
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

PURPOSE

The purpose of this study was to ascertain attitudes of undergraduate students enrolled in the School of Technology at Indiana State University toward ten selected safety concepts related to educational activities in the shop.

PROCEDURES

The population consisted of the 951 students attending one or more industrial education courses at Indiana State University during the fall semester of 1970.

The instrument was a form of the semantic differential. The concepts of safety were determined by reviewing the literature for the thirty most mentioned concepts and reduced to fifteen when rated by industrial education teachers. The clarity and general meaning of the remaining fifteen were checked in a pilot instrument. A revised pilot instrument indicated those ten concepts considered most suitable.

Specific concepts rated by the students were: 1. Instruction in Proper Handling of Tools and Equipment. 2. Instruction in Safe Handling of Materials. 3. Teacher Exhibiting Good Safety Habits. 4. Housekeeping in the Shop. 5. Teacher "Talking Up" Safety. 6. My Knowledge of Hazards and Remedies. 7. Eye Safety. 8. My Attitude Toward Safety. 9. My Using Personal Protective Equipment. 10. Procedures for Lifting.

The classification variables used were: age, marital status, high school industrial education courses, industrial employment, high school driver training, driver training in college, college course in safety, physical injury, injury witness, semester hours transferred, hours completed in a technical area, hours completed toward a degree, and area of major interest.

The urn randomization technique was used to compare the mean differences of 100 randomly selected equivalent size groups to the mean difference of scores of each variable group. The .05 level of confidence was used to reject the null hypothesis in forty-six of the 217 comparisons of group attitudes toward the concepts of safety.

FINDINGS AND CONCLUSIONS

1. Students over twenty-one had more favorable attitudes toward four of the ten safety concepts compared to younger students.

2. Married students' attitudes were more favorable than unmarried students toward eight of the ten concepts.

3. Students who experienced three or more semesters of industrial education in high school had more favorable attitudes toward four of the ten concepts when compared to students who had fewer semesters.

4. Industrial work experience of six months or more was not a significant factor that influenced student attitudes toward the concepts.

5. Driver training courses in high school or college did not result in a notable pattern of better student attitudes toward the concepts.

6. The nineteen students who had taken a safety education course in college held more favorable attitudes toward four of the ten safety concepts when compared to the 907 students who had not taken such a course.

7. Students' attitudes toward the safety concepts were not significantly more favorable as a result of being associated with, or experiencing a serious injury.

8. The attitudes of students who had received thirty or more semester hours of instruction at other institutions did not differ significantly toward the ten concepts.

9. No one subject matter area was outstanding in developing more favorable student attitudes toward the safety concepts.

10. Freshmen students had less favorable attitudes toward seven of the safety concepts.

11. Sophomore and junior students had attitudes toward the concepts that were not generally more favorable or unfavorable when compared to the other technology students.

12. Seniors' attitudes were more favorable toward five of the ten concepts.

The four safety concepts, Housekeeping in the Shop, Teacher "Talking Up" Safety, My Knowledge of Hazards and Remedies, and My Using Personal Protective Equipment, were considered to be more important by the students.

Further study was recommended to determine the influence of similar personal factors and the influence of a separate safety course.

Order No. 73-18,210, 176 pages.

34: 599-A Aug '73

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Van Etten, Marvin, Douglas
(Last name) (First name) (Middle name)

Exact Title An Evaluation of the Mechanical Technology Program at Bradley University by 1966 Through 1970 Graduates

Degree granted Ed. D., Date 1972, No. of pages in report 228

Granted by Indiana University Terre Haute, Indiana
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose: The primary purpose of this study was to appraise the Mechanical Technology program in the College of Engineering and Technology at Bradley University and to identify industrial roles of its graduates. Information was obtained, by questionnaire, from 119 industrially employed graduates of the program.

Procedure: To achieve the primary purpose, a combination closed form - open form questionnaire was developed and mailed to 211 graduates of the program. From the responses, 119 graduates currently employed in industrial positions were selected for the basis of the study. The areas included in the questionnaire were: General Information, Job Description, Education, Continuing Education, Job Satisfaction, Curriculum Evaluation, and Curriculum Recommendations. Supplementary data were obtained from related research and literature.

No hypotheses were tested, as the questionnaire was designed soley to discover the scope and nature of the Mechanical Technology Curricula.

Participating respondents by graduating years were 17, 1966; 25, 1967; 32, 1968; 34, 1969; and 48, 1970. Analyses of questionnaires were made and classifications, sub-classifications, job titles, department titles and evaluation suggestions were developed from requested comments and responses.

Major Findings: 1. Engineering activities as job responsibilities were reported by 71 of the 119 respondents. 2. Promotion or advancement had been experienced by 60 percent of the respondents. 3. Average current salary was about $2,000 more than the average initial salary. 4. A vast majority (87.4 percent) responded that they were adequately prepared for their initial industrial position. 5. Most (82.3 percent) felt their college preparation was equivalent to that of their colleagues and to those from other degree programs at Bradley University. 6. Significant recommendations from respondents were: (1) to increase the emphasis on communication skills, (2) include more actual industrial cases in class work, (3) make engineering courses available, and (4) maintain same basic program.

Conclusions: 1. Although the graduates of Mechanical Technology have had somewhat limited time to establish professional careers, the study notes that graduates have been accepted in professional job titles and have made significant advancements within the industrial milieu. 2. Opinions expressed by graduates of the program concerning their undergraduate preparation indicated that they believed it compared favorably with other baccalaureate degree programs offered at Bradley University. 3. Several of the responses, considered together, indicated that graduates had achieved a high degree of professional satisfaction and were stimulated by their working colleagues and their industrial roles. 4. Respondents indicated that more emphasis should be placed on speech, communications, and technical report writing in their curriculum course work.

Recommendations: 1. Increased emphasis should be placed on achieving national and local recognition of Industrial Technology programs and the industrial role capabilities of graduates from these programs. 2. Technical writing and communication skills should be required to a greater degree in the curricula and as an integral part of curriculum course work. 3. The findings as reported by the graduates should be considered in future changes that are proposed for the Mechanical Technology Curricula at Bradley University. 4. A longitudinal study of the respondents should be made at periodic intervals to assess the graduate's professional advancement as well as his future views concerning the curricula. 5. Additional studies of Industrial Technology graduates from other programs should be made to more accurately ascertain the scope of required curricula and industrial utilization of the graduates. 6. The structure of the Mechanical Technology curricula at Bradley University should be retained as nearly as possible in its present form.

Order No. 73-10,878, 228 pages.

33: 6150-A May '73'

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Waks, Shlomo,
(Last name) (First name) (Middle name)

Exact Title The Development and Testing of an Instructional Model for Laboratory Experiments on Electronic Circuits in College-Level Engineering

Degree granted Ph. D., Date 1973, No. of pages in report 236

Granted by Michigan State University East Lansing, Michigan
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to create an instructional model which would improve a student's understanding of the operation and application of electronic circuits, and to increase his laboratory skills through the use of a systematic approach involving audio-tutorial techniques. A model for laboratory experiments on electronic circuits was suggested for implementing this systematic approach.

There are eleven main components of the model developed:

1. Preliminary work by a student based on handouts and assigned reading, including calculations of electrical performance that will be measured in the laboratory experimentation.

2. Use of audio-tutorial techniques in the theoretical analysis of the circuit and its applications.

3. Use of an oscilloscope as a powerful medium in studying electronic circuits for scanning the output characteristics, displaying waveshapes at various points in the circuit, or scanning the actual transfer characteristic of the circuit; that is, the output voltage as a function of the input voltage.

4. Use of guides and flow charts describing the experiment procedure (optional).

5. Creation of conditions for a student's active involvement in the experimenting process--letting him take part in the "design" of the circuit by calculating some missing components and providing immediate feedback for reinforcement. Measuring the circuit operation and getting expected results during the experimental process frequently provides a student with successful experience; this increases his involvement.

6. D.C. (Direct Current) and A.C. (Alternating Current) measurements of the circuit's operation and comparison to precalculated values of voltage, current, or amplification.

7. The use of an experimental analysis of the circuit; a combination of laboratory and theoretical investigation of the circuit's reaction to external or internal changes imposed on it, like changing feeding voltages, loading, environmental circumstances (temperature), or changing the values of its internal components. If an integrated circuit is under experiment, only external changes are investigated.

8. To keep in touch with the real world, the student is shown a few typical practical applications of the circuit at this stage; the newly learned details of the circuit are investigated under real conditions. It is recommended that media be utilized for application demonstrations if "live" practical circuits are unavailable.

9. College-level students are asked at this stage to design adequate modifications to be introduced into the circuit in order to satisfy newly imposed conditions of operation.

10. The posttest in any format (oral, written, performance, or in a combination of the three testing forms) is to be taken right after the experiment procedure.

11. The modular structure of the model enables its use at different levels (i.e., engineering, community college, technical school).

The model was applied to the "Electronic Devices Laboratory" E.E. 484 (senior level) in the College of Electrical Engineering at Michigan State University during Fall Term, 1972. A total of 108 students was divided into ten lab sections. Five of the sections (treatment groups) used the suggested model to perform their lab experiment: The Schmitt Trigger--Theory and Applications. This lab experiment was scheduled to last two weeks, for three hours weekly. The other five sections, comparison groups, performed the same experiment under the traditional method of experimentation. The treatment groups had three instructors, and the comparison groups had two other instructors.

The following items were prepared to be used in the Schmitt circuit experiment:

1. Theory Sheets, including the Schmitt circuit theory and applications.

2. Experimental Procedure Sheets.

3. A slide-tape presentation of the Schmitt analysis and applications.

The experiment was evaluated by four tests: a pretest, a posttest, a retention test (given one month after the posttest), and a student attitude test. An instructor's evaluation form was filled out by the three treatment group instructors. The results of the four student tests were analyzed statistically, utilizing the CDC 3600 computer at the Michigan State University Computer Center. The Finn Multivariate Analysis of Variance program was employed in the analysis.

The main findings of the statistical analysis were summarized:

1. No significant difference ($p<0.9544$) was found in the mean scores of the pretest when comparing the treatment and comparison groups, indicating equivalence of groups at the beginning of the lab experiment.

2. Significant difference in the posttest ($p<0.0004$) and retention test ($p<0.0001$) between the treatment and comparison groups indicated that the members of the treatment groups learned and retained more than students in the comparison groups.

3. No significant difference was found in the mean scores within the treatment groups ($p<0.8151$) and within the comparison groups ($p<0.7023$) in any of the three tests (pretest, posttest, and retention test).

4. Members of the treatment groups held a significantly ($p<0.0120$) more positive attitude toward experimentation by means of the model than members of the control groups held toward experimentation through the conventional method.

In the Instructor's Evaluation Form, the treatment groups' instructors reported a favorable reaction regarding the application of the model in the electronics laboratory.

Order No. 73-20,419, 236 pages.

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wall, Edward, Rosser
(Last name) (First name) (Middle name)

Exact Title A Study of the Trade and Industrial Programs in Vocational Education at Hinds Junior College Raymond, Mississippi

Degree granted Ed. D., Date 1972, No. of pages in report 263

Granted by The University of Mississippi University, Mississippi
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study is designed to: (1) compile a data base of enrollment data and demographic data of graduates from the trade and industrial programs at Hinds Junior College, Raymond, Mississippi, and (2) gather data that may be used logically and effectively to evaluate the course content for each of the trade and industrial training programs.

The study population consisted of 345 graduates from 13 trade and industrial programs during the 1968-69, 1969-70, and 1970-71 academic years. The research for this study was addressed to the three broad areas of enrollment data, demographic data of the graduates, and program evaluation as provided by reports from graduates, Craft Committee members, and industrial employers of graduates of the 13 trade and industrial programs.

The primary source for enrollment data were the instructors' monthly reports and the final reports to the Vocational Division of the Mississippi State Department of Education. The demographic data were obtained entirely from student personnel files. A questionnaire was used to survey the graduates, Craft Committee members, and the industrial employers concerning program evaluation.

The student population in trade and industrial programs increased by 231 students (39.3 percent) from the 588 students enrolled in 1967-68. The data indicate that the number of second-year students remained fairly constant - 162 in 1968-69, 169 in 1969-70, and 163 in 1970-71. Therefore, the increases in enrollment were provided primarily by the initial enrollees.

Demographically the graduates were 30 percent veteran, 70 percent non-veteran, 98 percent males, 2 percent females. The range of ages was from 15 to 64 years of age. The mean and median ages were 23.3 years and 20 years respectively. The educational levels obtained by the graduates prior to enrolling in vocational school ranged from third grade to college graduate with a mean level of 11.3 and a median of 12 years of formal schooling. Thirty-three Negroes (9.6 percent) graduated during the time span of this study. The remaining 312 graduates were 305 Caucasian males and seven Caucasian females.

The mean grade-point average was 2.72 based upon a four-point system. Generally, students who graduated within the expected time performed at a higher level than did students who required longer periods to fulfill graduation requirements.

The mean rating for training programs ranged from 3.2 to 4.5 by the Craft Committees and from 3.3 to 4.6 by the graduates based upon a five-point scale. A mean rating of 3.7 was provided by the graduates and by the Craft Committees for the 13 programs. The results obtained from the employers ratings of the graduates reveal a marked similarity to the rating provided by the graduates and Craft Committees. The rating furnished by the employers of the graduates ranged from 3.0 to 4.1 with a 3.7 mean rating.

It is recommended that the Vocational Department at Hinds Junior College develop and initiate a program of student recruitment which will provide an increased enrollment in all trade and industrial programs. It is further recommended that policies and procedures be developed which will bring about a substantial increase in the retention rate of first year students for the second year of formal training and consequently cause an increased number of graduates in each of the trade and industrial programs.

It is recommended that either modifications be made in existing programs or new programs be developed so that the skills taught in trade and industrial programs will be suitable and inviting to the female population. A concerted effort should be made to recruit female students for the several existing programs which provide training suitable for female enrollment.

Order No. 73-11,430, 263 pages.

33: 6253-A May '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wallace (Last name), Donald (First name), Frank (Middle name)

Exact Title The Relationship of Industrial and Engineering Technologists in the Spectrum of Technical Occupations

Degree granted Ph. D., Date 1972, No. of pages in report 137

Granted by University of Missouri (Name of institution) Columbia, Missouri (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The relationship of those individuals engaged in technological occupations in the United States has been identified as a continuum or technical spectrum. Many authors use a graphical representation such as the one shown below to illustrate the technologist's occupational level with respect to a technical spectrum.

Craftsman	A. S. Degree Technician	B. S. Degree Technologist	Engineer	Scientist

FIGURE 1

TECHNICAL SPECTRUM

The purpose of this research study was to ascertain the relationship between industrial and engineering technologists in forming the internal framework for the technologist's segment in the spectrum of technical occupations.

On the basis of the expressed opinions of engineering and industrial technologists, technology educators and the immediate supervisors of the technologists, the following conclusions and recommendations were made.

The relationship between engineering technologists and industrial technologists in the spectrum of technical occupations can be represented as shown in Figure 2. Although there is not complete agreement on the exact positioning of the division line, there is a significant difference between the industrial technologists' and engineering technologists' position in the spectrum of technical occupations.

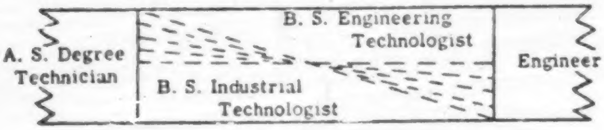

FIGURE 2

RELATIONSHIP OF ENGINEERING AND INDUSTRIAL TECHNOLOGISTS

Engineering technologists and industrial technologists cannot be combined into one classification. The two technologists occupy different positions on the technical spectrum, perform different job functions in industry and require different and unique curriculums for their training.

Engineering technology can be viewed as extending the specialized training time for the technician to four years. The program content required for the training of engineering technologists is aimed at providing support for engineering activities. The emphasis in the program content for engineering technologists is one of "specialization" which requires a greater math-science-technical content.

The uniqueness of industrial technology results from its effectiveness in combining courses from other professional areas, especially business and supervision. The four-year baccalaureate degree in industrial technology is not usually designed to further specialize the student but to provide him with a broader educational background. The industrial technologist is most likely to hold an industrial position in manufacturing and production control.

While some overlap and proliferation of program content and job function seems to exist between the engineering and industrial technologists, the two areas are distinctly different in objectives, the two types of technology should not be combined into a single technologist training program, and the technology curriculums should not provide the same content or train for the same occupational function.

Engineering technology and industrial technology should remain separate and unique programs, not only between themselves, but also respectively from engineering and industrial arts.

Order No. 73-7104, 137 pages.

(33: 4971-A) March '73'

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Weathers (Last name), Richard (First name), Dean (Middle name)

Exact Title Proposed Content of a Fluid Power Technology Curriculum for Four-Year Colleges and Universities

Degree granted Ed. D., Date 1972, No. of pages in report 103

Granted by University of Arkansas (Name of institution) Fayetteville, Arkansas (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The Problem

The purpose of this study was to develop a four-year college curriculum that would be of the greatest value to future fluid power technologists and their employers. The study had two distinct objectives: To determine what existing college courses would be of the most value to future fluid power technologists, and to determine what topics or units should be incorporated into the various fluid power courses.

Procedures

The sample for this study consisted of sixty Industrial Consultants randomly selected from a current listing of American fluid power manufactures and distributors. A questionnaire was developed and mailed to the consultants that listed a number of college courses and fluid power topics thought to be pertinent to the success of future fluid power technologists. Fifty-two of the sixty manufactures and distributors responded for a return of eighty-seven percent. These variables were assigned a five-point rating scale to be evaluated by the Industrial Consultants. The variables with the highest mean scores were chosen for inclusion into the fluid power curriculum.

Summary

The following is presented as a summary of the major findings of this study.

1. The most valuable business courses for inclusion in a fluid power technologist program concern marketing, business communications, human relations, and industrial management.
2. The most valuable mathematics courses as rated by the Industrial Consultants were college algebra and trigonometry.
3. General physics, analytical mechanics, electronic circuits, and thermodynamics were rated as courses most valuable in the physical science block.
4. The most valuable technical related courses were technical writing, industrial electricity, applied electricity, and principles of machine design.
5. The topics rated highest in the basic fluid power block were principles of hydraulics, basic principles of pneumatics, and principles of power hydraulics.
6. The topics rated of most value in the hydraulics block included analysis and trouble-shooting, hydraulic circuit design, and basic fluid circuits.
7. The most valuable topics in the pneumatics block were physical principles, pneumatic directional control valves, and solenoid valves.
8. Fluid logic, fluidic control systems, and sensors were rated of most value in the fluidics block.

Conclusions

The following conclusions appear feasible based on the findings of this study.

1. A college degree is important for entrance into the fluid power technologist field.
2. A good background in mathematics and the physical sciences is necessary for success as a technologist in the fluid power field.
3. The ability to apply theoretical knowledge - working with one's hands - is highly desirable for technologists
4. A real need is felt for well prepared men to enter the fluid power field.
5. Communications, both verbal and in writing, is necessary for success as a technologist in the fluid power field.
6. The ability to work with people is important for a fluid power technologist.

Recommendations

1. The courses rated highest by the Industrial Consultants should be included in the curriculum within the framework of each institution's requirements.
2. Courses that develop the student's understanding of human nature are highly recommended.
3. If the institution has a well developed industrial technology or industrial education program for support, the addition of four courses would be needed to prepare students for entrance into the fluid power field. These courses are introduction to fluid power, applied hydraulics, applied pneumatics, and fluidics. If the institution does not have one or both of these programs, it will be necessary to further develop an adequate background of theory and practice for their students.
4. Analysis and trouble-shooting of circuits should be taught in all of the fluid power courses.
5. It is recommended that the first two fluid power courses be made available to students majoring in other areas of technology because fluid power has become so universal in application to all industrial fields.

Order No. 72-29,663, 103 pages.

33: 2255-A Nov '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wheeler, David, Nelson
(Last name) (First name) (Middle name)

Exact Title The Relationship Between Amount of Vocational Education and Employment Success: A Study of Minnesota Post-High Vocational-Technical School Entrants

Degree granted Ph. D., Date 1972, No. of pages in report 97

Granted by University of Minnesota Minneapolis, Minnesota
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to investigate the affect of vocational curricula upon certain desirable program outcomes. Specifically, answers were sought to the questions of whether or not increasing numbers of months of specific vocational education, up to graduation from a given curriculum (1) leads to former student employment in jobs more related to the training program undertaken, (2) results in greater employment satisfactoriness, and (3) leads to greater employment satisfaction.

A number of researchers have investigated the affect of vocational education on occupational status. In general, vocational programs have been found to have a positive affect upon this criterion measure. The two other criterion measures, employment satisfact[illegible]ness and employment satisfaction, have been less often studied.

DESIGN

The study population and sample was deriv[illegible] from the population of Project MINI-SCORE, a longitudinal study of [illegible] effectiveness of various pre-enrollment measures to assist in the counseling of potential post-high vocational students into suitable occupational programs. The present study population consisted of 642 students who applied and were admitted into one of twenty-four Minnesota Area Vocational Technical schools between September 1, 1966, and November 30, 1967.

Three occupational clusters were selected for study: (1) a technical cluster, (2) a skilled cluster, and (3) a clerical cluster. The students in these clusters consisted of approximately equal numbers of program graduates and drop-outs.

Prior to admission to the vocational schools, all students had been tested with the Project MINI-SCORE testing battery, which consisted of measures of vocational aptitudes, vocational interests, personality, vocational maturity, employment-related needs, and a personal information form.

One year after graduation, the graduate groups were followed-up with a mailed questionnaire to determine their employment status. For those who were employed, scores on the Minnesota Satisfaction Questionnaire and Minnesota Satisfactoriness Scale were determined. The drop-out groups were followed up during approximately the same time period as their graduate peers.

There were two variables employed to measure treatment. These were (1) number of months employed, and (2) whether or not graduated. An index of the relatedness of the job to the former training program was also included. In all, information on each individual consisted of 79 measures of independent variables and 3 measures of criterion variables.

Analyses of the data were performed separately for each of the three occupational clusters. The criterion variable of occupational status was tested using a chi-square test for independence between the graduate and the drop-out groups. The criterion variables associated with employment satisfactoriness and employment satisfaction were tested by regression analysis, using a covariance design. In this analysis, a "full" then a "restricted" model were constructed for each occupational cluster, and an F-ratio was calculated to determine the ability of the treatment alone to predict the criterion.

Brief Findings

There was a significant relationship between amount of vocational education received and occupational status. Members of the graduate sample, for all three occupational clusters, were more likely to be employed in an occupation related to training than were the drop-outs.

There was no significant relationship between amount of vocational education received and either measured employment satisfactoriness or employment satisfaction, when several selected pre-enrollment variables related to each of these criterion were controlled. This was true for all three occupational clusters, regardless of whether or not the relatedness of the job to the training program was taken into account.

Order No. 72-27,818, 97 pages.

33: 1609-A Oct. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author White, Charlie, H.
(Last name) (First name) (Middle name)

Exact Title A Comparative Study of Current First Aid Practices and Supplies and the Desirability of Such Practices and Supplies as Proposed by Administrators and and Industrial Arts Teachers

Degree granted Ed. D., Date 1972, No. of pages in report 125

Granted by Utah State University Logan, Utah
(Name of institution) (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Purpose

The purpose of this study was to collect, analyze, and compare data relevant to first aid practices and supplies in industrial arts education and to compile the information into guidelines for the industrial arts field.

Procedure

The following five hypotheses were tested:

Hypothesis 1: There is no significant difference between the first aid practices by administrators and industrial arts teachers.

Hypothesis 2: There is no significant difference between the opinions of administrators and industrial arts teachers on first aid practices.

Hypothesis 3: There is no significant difference between the practices designated by administrators and industrial arts teachers on first aid supplies.

Hypothesis 4: There is no significant difference between the opinions of administrators and industrial arts teachers on first aid supplies.

Hypothesis 5: There is no significant difference between opinions and practices designated by administrators and industrial arts teachers as a single group.

Analysis

An analysis of variance and the chi-square test of independence was used to analyze the data. Analyses were made using data from administrators and industrial arts teachers.

Findings

Total Population: For the total population it was found that first aid practices of administrators and industrial arts teachers were independent of their opinions regarding the practice or the desirability of the practice when taken as a single group.

There was a high degree of agreement among administrators and industrial arts teachers on first aid practices and opinions as it related to the practice. On some questions there was a statistical difference between administrators and teachers; however, the differences were not practical ones.

Recommendations

1. Research should be conducted to ascertain why many industrial arts teachers feel that many of the first aid practices in this study did not apply in their shops and laboratories. 2. Consider the use of the first aid practices and in the guidelines as a model to be followed by administrators. 3. Similar research should be conducted in other school districts and states using the checklist of first aid practices and supplies developed as part of this study. Order No. 73-959, 125 pages.

33: 3171-A Jan '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION*
JOINT RESEARCH COMMITTEE - AIAA & ACIATE

Author White, Edward, Hartwell, Jr.
(Last name) (First name) (Middle name)

Exact Title The Development of Interchangeable Mass Manufacturing in Selected American Industries from 1795 to 1825.

Degree granted Ph. D., Date 1973 No. of pages in report 302

Granted by University of Maryland College Park, Maryland
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

Purpose of Study: To investigate the development of interchangeable mass manufacturing in the American small arms and clockmaking industries from 1795 to 1825.

Source of data and method of study: An historical/descriptive approach was taken with balanced emphasis on topical and chronological development. An investigation of the literature was conducted, and selected museums, historical agnecies and public and private historical institutions were contacted. Information was then synthesized according to topical and chronological development.

Findings and Conclusions: The following conclusions were reached as an outgrowth of this study:

1. The earliest attempts to achieve interchangeable mass manufacturing were of European origin.
2. The achievement of interchangeable mass manufacturing in the American small arms and clockmaking industries was traceable through a series of stages. Fulfillment of the system was complete by 1825 in both industries.
3. No individual could be credited with being the sole American innovator of a system of interchangeable mass manufacture. The development of the system in the small arms and clockmaking industries was the result of the accumulation of advancement in manufacturing techniques by numerous manufacturers and inventors.
4. Development of the system of interchangeable mass manufacturing included the introduction of numerous production machines and techniques for which patents were obtained.
5. The small arms and clockmaking industries employed similar principles in manufacturing techniques. Specialized single-function machine tools driven by an external power source were systematically arranged to allow for reduction of the manufacturing process to a series of single production tasks. Both industries developed systematic gauging and inspection techniques, component sub-contracting, and a division of labor based on specialization by 1825.
6. The trend toward interchangeable mass manufacturing resulted in substantial increases in the production volume in both industries. Increases in production levels may be seen due in part to reponse to market demands, as well as the result of advancements in production efficiency due to technical refinement of production processes.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wilkinson, George, Bird
(Last name) (First name) (Middle name)

Exact Title A DescriPtion of Procedures and Instruments for Describing Selected Characteristics of a Quality Program of Industrial Arts Education in a Large Metropolitan School District

Degree granted Ed. D., Date 1972, No. of pages in report 217

Granted by Temple University Philadelphia, Pennsylvania
(Name of institution) (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study was concerned with developing a procedure for quantitatively describing a junior high school industrial arts program in a large metropolitan school district in terms of contemporary thinking regarding teaching personnel, instructional program and facilities, and applying the procedure to the program in the Philadelphia public schools.

Characteristics of a contemporary junior high school industrial arts program and evaluative criteria were derived from literature in the field and then evaluated by a jury of thirteen persons drawn from national, state and local levels. A General Information Form, Interview Check List and Observation Check List were formulated from the resulting criteria and tested for reliability. The General Information Form was completed by 116 industrial arts teachers in 24 schools. The investigator interviewed each teacher, observed him teaching and completed the appropriate forms. Data from the forms were processed by computer and conslusions were drawn in terms of relative strength of the identified characteristics.

Conclusions

1. The instruments developed in this study have reliability coefficients that are generally acceptable.
2. City industrial arts teachers appear to be generally competent in directing student activities and have desirable personal characteristics, but too many teachers have substandard certification.
3. There is a need to improve the preparation and professional development of teachers as indicated by the failure of most teachers to a) plan and organize instructional activities on the basis of established objectives and b) keep abreast of current philosophical concepts and trends in teaching practices.
4. There is insufficient time allotted to industrial arts in the junior high school curriculum.
5. The industrial arts program is loosely organized on a city-wide basis.
6. The program generally has the support of the principals, but there is a need for principals to participate more actively in program improvement.
7. Instructional content is strong in manipulative activity, but observed practices are narrow in scope, and there is a need for more guidance and safety education.
8. Laboratories are too small for normal size classes.
9. Major equipment is generally in good condition, but there is a need for a more definite replacement schedule.
10. Small tools and supplies are generally adequate.
11. There is a need for improvement in the quantity, quality and variety of reference materials for students.

Major Recommendations

1. Instruments such as those developed in this study should be applied to other large cities.
2. The instruments should be applied to the Philadelphia schools annually to determine the extent of change occurring in the program.
3. To decrease the number of teachers with substandard certification, local recruitment efforts should be intensified.
4. Teacher training programs should place greater emphasis upon how to a) establish objectives, b) develop a program consistent with the objectives, c) implement the program, d) plan and conduct program evaluation and e) develop a professional commitment to teaching.
5. A local in-service teacher training program should be provided to assist teachers in developing the competence and motivation for program improvement.
6. Existing scheduling procedures should be examined and revised to provide more time for industrial arts.
7. Program improvement at the classroom level should be directed toward a) establishment of objectives, b) evaluation of the program in terms of the objectives, and c) revision as needed.
8. Guidance and safety education should receive greater emphasis.
9. New laboratories should meet or exceed standards established by the Pennsylvania Department of Education.
10. Renovations of existing laboratories should provide more space where possible.
11. A definite plan for equipment replacement should be initiated.
12. Teachers should make greater efforts to acquire and use reference materials.

Order No. 72-27,215, 217 pages.

33: 1480-A Oct. '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wilkinson (Last name), William (First name), Edward (Middle name)

Exact Title A Comparison of the Academic Achievement Level Between Cooperative Education Students and Non-Cooperative Education Students in the High Schools of Polk County, Florida

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 92

Granted by The Florida State University (Name of institution) Tallahassee, Florida (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

The purpose of this study was to investigate the relationship between Cooperative Education students and students not in the Cooperative Education program. An attempt was made to determine what effect, if any, participation in the Cooperative Education programs had on the level of academic achievement of Cooperative Education students as determined by percentile scores made on the Florida Statewide Twelfth Grade Testing Program (FSTGTP).

Two groups of students were studied. The groups consisted of (1) all students in the Diversified Cooperative Training (DCT), Distributive Education (DE), and Cooperative Business Education (CBE) programs of Polk County who participated in the FSTGTP in the Fall of 1970 (N=453), and (2) all other seniors in the same county who participated in the FSTGTP in the Fall of 1970 (N=2422).

Data were analyzed by use of analysis of variance for one-way design to determine if there were any statistically significant differences between the groups. The same test was used to determine if there were any statistically significant differences between non-white, white, male and female students in each of the groups. Comparisons were made on the total percentile scores made on the FSTGTP. General Linear Hypothesis was used to test hypotheses of the independent variables and the interaction produced.

Statistical Design

The statistical design used for the experiment was a 2 x 3 x 2 x 2 factorial with four fixed factors. The following variables were considered: Program, Cooperative Education and Non-Cooperative Education; Race, White and Non-White; Sex, Male and Female, IQ, High (109 and above), Medium (90-108), and Low (89 and below).

Findings

The one-way analysis of variance statistical tests did initially show statistically significant differences in the programs with the Cooperative Education group scoring significantly lower mean scores than the Non-Cooperative Education group in all except the low IQ scores. However, when a complete four-factor analysis was made including IQ, Race, Sex, Program, and their interactions, the following findings were noted:

1. There were no significant differences between Cooperative and Non-Cooperative Education programs on their mean percentile scores made on the FSTGTP, when the effects of Sex, Race and IQ were accounted for.
2. There were no significant differences between male and female students in the Cooperative and Non-Cooperative Education programs on mean percentile scores made on the FSTGTP.
3. No significant differences in interactions were noted at .05 except that of Program x Race x IQ.
4. Significant differences were noted between levels of IQ and Race (.05).

Conclusions

1. Cooperative Education students as used in this study do not differ significantly academically as measured by the FSTGTP from those not in the Cooperative Education program and therefore should be considered as college material.
2. Academic achievement of Cooperative Education students was not impeded by participation in a Cooperative Education program.
3. Requiring high school seniors to take college preparatory courses for college entrance, based on the FSTGTP, is not justified nor is it realistic.

Order No. 72-27,938, 92 pages.

33: 2256-A Nov '72

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wong (Last name), LaVerne (First name), Beatrice (Middle name)

Exact Title Student Perception of the Effectiveness of the Area Vocational Secondary School Programs of Texas in Meeting Self-Perceived Interests and Needs

Degree granted Ph. D., **Date** 1973, **No. of pages in report** 143

Granted by Texas A&M University (Name of institution) College Station, Texas (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

Statement of the Problem

This study investigated the effectiveness of area vocational school programs as they relate to self-perceived interests and needs of students. A determination of the level of student awareness of area vocational school programs was made. Counseling and guidance procedures used to enhance student awareness for vocational development were explored.

Method of Procedure

To secure pertinent data, it was necessary to develop an instrument to which students could respond. This was done, and a field test of the questionnaire ascertained its proficiency in securing the desired type of information. Data from the Texas Education Agency was used to determine the area vocational schools in Texas which met criteria for involvement in the study. From this group 8 receiving schools and 22 sending schools were randomly selected. The student sample included 672 randomly selected subjects. Half were participators in area vocational school programs, and half were non-participators.

The questionnaires yielded information from which an overall score for program effectiveness and student awareness was derived for each student in the sample. An analysis of variance, three factor design, was used to compare the dependent variables of program effectiveness (PES) and student awareness (SAS). The three factors were participation, type of school, and sex. Scheffe's method of multiple contrasts was used to determine specifically which groups differed and to what degree.

Presentation of Findings and Conclusions

Data from the study demonstrates significant difference in program effectiveness between participators and non-participators in the area vocational school. Subjects who participate in the AVS program report that the vocational training which they receive is highly effective in meeting their self-perceived interests and needs. Non-participators, involved in educational programs other than in the AVS, report medium effectiveness of these programs in meeting their individual interests and needs. In addition, non-participators perceived the AVS program as less effective in meeting student interests and needs than did those who were enrolled in the program.

Students from sending schools indicate significantly greater program effectiveness in meeting their self-perceived interests and needs than students from the receiving schools. An interaction effect of type of school by sex was also shown.

Results give evidence of high student awareness of AVS program offerings and opportunities by both participators and non-participators. No difference was found between students who come from sending schools and those from receiving schools; and no difference according to the sex variable was demonstrated in awareness. Although high student awareness was evident within the total sample, differences significant at the .05 level were shown between participators and non-participators. Participators demonstrated greater awareness. An interaction effect of type of school by sex indicated that females from receiving schools were more aware than the other three groups.

Exploration of counseling and guidance techniques and procedures used by schools to enhance awareness revealed incongruence between the procedures used by the school and those reported by students to be effective sources of information of AVS program offerings and opportunities. According to students, the school utilizes such procedures as assembly programs, printed materials, and speakers to enhance awareness. Students indicated that their source of information about AVS programs were individuals such as peers already in the program, the counselor, and members of the AVS staff. In general, school techniques listed were group techniques which were formal and impersonal. Student focus on significant sources of information was on individuals through personal contact and informal interaction.

Findings also give indication that although perceptions of vocational education programs have improved in very recent years, their image still reflects unfavorably biased attitudes. The stigma still prevails that vocational training at the secondary level is designed for those who are not academically inclined. Thus, vocational training is not applicable to the total student population.

Order No. 73-21,715, 143 pages.

34: 1189-A Sept '73

*Place summary on this page only.

SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wood (Last name), Milton (First name), Eugene (Middle name)

Exact Title Transfer From Audiovisual Pretraining to an Instrument Flight Task

Degree granted Ph. D., Date 1973, No. of pages in report 145

Granted by Arizona State University (Name of institution) Tempe, Arizona (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

A technique was developed for providing transfer-of-training from a form of audiovisual pretraining to a simulated instrument flight task. A light aircraft instrument trainer with simulated motion (i.e., the Link GAT-1) was used to provide the training environment for the transfer task. Ss were required to make 500 foot per minute climbs and descents to a given altitude, and to maintain level flight under simulated rough air conditions.

An Audiovisual Cockpit Trainer (ACT) was constructed to provide the pretraining sequences. The ACT was designed to represent the GAT-1 cockpit and provided: (1) wheel control; (2) a rear-projection screen which represented the instrument panel of the GAT-1; and (3) response indicator lights which were used for feedback purposes. Ss made open-loop wheel (pitch) responses to 35mm pictures of instrument configurations displayed on the ACT "panel" by rear projection. Programmed slide sequencing and audio instruction were provided by a cassette tape programmer.

To provide a methodology for representing the continuous flight task in discrete terms, mutually exclusive "categories of flight" were defined. Each category described a high probability instrument configuration and required a control response which would initiate aircraft movement toward a desired criterion condition. Through differential sequencing of flight categories during pretraining, two basic modes of pretraining were explored. One group of 15 Ss received pretraining in flight categories which were sequenced in a natural task order, while a second group of 15 Ss were trained in the same flight categories presented randomly. A third, or baseline group of 15 Ss, received no pretraining on flight categories, but did receive a form of pretraining which acquainted Ss with single-instrument reading skills only.

Based on measures of transfer performance, it was concluded that both sequenced and random forms of flight category presentation appear effective as pretraining techniques. Correlational comparisons between pretraining and transfer suggest that random pretraining benefits early transfer performance while sequenced pretraining benefits late transfer performance. Considering the positive findings of the study, it appears that this form of least-cost audiovisual pretraining would be effective in a flying training program. Enhanced training and cost-effectiveness could result from an improved control in the early learning environment, and better utilization of more sophisticated training devices.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Woolf (Last name), William (First name), Devue (Middle name)

Exact Title A Comparison of Selected Self-Concepts and other Characteristics of Secondary Students Enrolled in Utah Senior Vocational and Non-Vocational Classes.

Degree granted Ph. D., **Date** 1972, **No. of pages in report** 216

Granted by Michigan State University (Name of institution) East Lansing, Michigan (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

This study was undertaken to determine selected characteristics of students enrolled in Utah senior vocational classes and to identify ways in which vocational students were either the same or different from their non-vocational peers. The variables of particular importance were: sex, place of residence, intelligence, academic achievement, socio-economic status, self-concept of academic ability, self-concept of vocational ability, and perceived parents', friends', and teachers' evaluations of academic ability. The influence of the variables intelligence, sex, place of residence, academic achievement, and socio-economic status upon the self-concept variables was of specific interest.

The population samples were Utah high school seniors. Four sampling techniques were employed: (1) cluster sampling of total schools and total classes, (2) stratified sampling of vocational specialties and place of residence, (3) random sampling of specific schools, and (4) non-random sampling of the rural school. Selected were seven high schools. Of the 674 students tested, 121 were enrolled in distributive education, 159 in office education (shorthand-transcription), 95 in agriculture education, 121 in home economics, 86 in trade and industry (automotives), and 92 in English or social studies classes.

Four instruments were administered: (1) The Michigan State General Self-Concept of Academic Ability Scale, (2) The Wamhoff Self-Concept of Vocational Ability Scale, (3) The Science Research Associates' Army General Classification Test (First Civilian Edition), and (4) A Self-Report Questionnaire. The Duncan Socio-Economic Index was used to determine students' socio-economic levels.

A randomized block statistical design was used for the test of significance. An analysis of variance, analysis of covariance, and correlation coefficients were the statistical treatments employed.

Only the major findings of the project are presented herein:

1. When vocational and non-vocational students were compared, only two variables were significantly different, academic achievement and self-concept of vocational ability. The non-vocational students scored significantly higher than the vocational students on the variable of academic achievement. The vocational students scored significantly higher on the variable self-concept of vocational ability.

2. In the comparison of each vocational specialty class with the non-vocational control class, a substantial degree of difference was found. The distributive student was significantly lower on intelligence and academic achievement scores, but significantly higher on self-concept of vocational ability scores. The office education student scored significantly higher on intelligence and academic achievement variables. The agriculture student scored significantly lower on intelligence, academic achievement, socio-economic status, and self-concept of academic ability; but significantly higher on self-concept of vocational ability scores. The home economics student did not depart significantly from the non-vocational student on any variable. Trade and industry [illegible] significantly higher than the control group on the intelligence variable, but significantly lower on the academic achievement variable.

3. When the above vocational student characteristic profiles were tested for consistency across schools, the distributive, agriculture, and trade and industry classes were consistent, without exception, from school to school. The office education and home economics classes were not consistent in student characteristics comparing schools.

4. All independent variables (sex, intelligence, socio-economic status, grade point average) except place of residence, influenced significantly self-concept scores.

5. The variables self-concept of academic ability and self-concept of vocational ability behaved differently for most statistical tests undertaken in the study.

The major conclusions of the study are:

1. The two groups, vocational and non-vocational, were more similar than they were different, but the characteristics registering a significant difference were important for educational purposes. Vocational classes enrolled less academically capable students than the non-vocational classes, but these same students possessed an enhanced perception of their abilities to perform in an occupation. There was some justification in giving credit for this enhanced perception in the vocational classes even though this study could not fully substantiate the claim.

2. The vocational specialties were not homogeneous on the variables tested. Agriculture, distribution, and trade and industry (automotives) classes could be branded "dumping ground" classes. The programs enrolling females, on the other hand, were concluded to be catering to the educationally superior students when compared to non-vocational students.

3. The variables of sex, intelligence, grade point average, and socio-economic status did influence the results of the study. The place of residence variable did not.

4. The variable self-concept of academic ability on self-concept of vocational ability did measure different dimensions of self-concept.

The major recommendations advanced related to ideas for further research but also included the following points. It is recommended that:

1. Utah school administrators and teachers examine the practice of enrollment procedures in vocational education currently used by the schools in the state.

2. Teaching practices in the agriculture, distributive, and trade and industry (automotives) classes should reflect the fact that they are teaching students significantly lower in academic performance than their non-vocational peers.

3. Teacher preparation programs for the agriculture, distributive, and trade and industry (automotives) teachers should implement material and practices to better prepare teachers to teach exhibiting and stated characteristics.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Wu (Last name), Jack (First name), (Middle name)

Exact Title Analytical Model of Curriculum Development and Evaluation for Manufacturing Engineering Education Programs

Degree granted Ph. D., Date 1973, No. of pages in report 264

Granted by Purdue University (Name of institution) Lafayette, Indiana (City, State)

Where Available: Microfilm (X) Microfish ( ) E.R.I.C. ( )

A curriculum is a coherent collection of courses offered in an educational institution. The relevance of the collection of courses with respect to the educational objectives has a decisive effect on the quality and the usefulness of the education program. The traditional process of curricular design through subjective assessment of the educational objectives and of the achievement of these objectives can no longer satisfy the requirement of the integrated educational planning systems approach. Several attempts have been made in developing an analytical and systematical method for curricular design. No concrete and/or operational model for this purpose has yet been developed.

The key factors in defining the structure of a curriculum model are the relevance, or the relative significance, of the courses with respect to the educational objectives and the speed of learning these courses. The essence of the curricular design problem is the time distribution among competing knowledge elements under the time constraint. This research developed three curriculum models, namely: the Optimization model, the Probabilistic Assignment model and the Ranked-significance model. The major difference among these three models is the forms adopted for measuring the above-mentioned two key factors. The level of optimality of the curricular models largely depends on our knowledge of the learning functions, which is still very much limited. Due to the lack of realistic data for the first two models, the Ranked-significance model is chosen for the purpose of manufacturing engineering curricular design.

Both domestic and foreign industrial surveys were conducted to obtain information for curricular design purposes. A thorough analysis of the characteristics and the progression of the manufacturing engineering profession and its education is given in this writing. The evolving and multidisciplinary nature of manufacturing engineering warrants the usefulness of the curriculum modeling. The theoretical example in this thesis demonstrates the capability and the sensitivity of the curricular model in evaluating an existing curriculum. The simplified model for the Taiwan manufacturing engineering program demonstrates the selectivity and the efficiency of the curricular model in developing a new curriculum.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Zaharchuk (Last name), Ted (First name), Michael (Middle name)

Exact Title Some Aspects of Planning For Post-Secondary Vocational Institutions: A Case Study, The Ryerson Polytechnical Institute.

Degree granted Ph. D., Date 1971, No. of pages in report

Granted by University of Toronto (Name of institution) Toronto, Canada (City, State)

Where Available: Microfilm (x) Microfish ( ) E.R.I.C. ( )

If educational planning is described as: defining a set of operational objectives and providing schemes for fulfilling the objectives, then this dissertation represents an attempt to describe the major dimensions of educational planning for a particular institution, the Ryerson Polytechnical Institute.

A major portion of this dissertation is devoted to a description of Ryerson and its educational sector. The research begins with a study of Ryerson's history and shows that its first fifteen years were dominated by the pre-eminence of Dr. H. H. Kerr who adhered to a "market-orientated" development philosophy. Also, Ryerson's educational sector is described as an example of 'monopolistic competition' where a number of institutions co-exist under competitive conditions and the basic strategy is 'product-differentiation.'

The analysis of Ryerson's history provides a backdrop for a study of the objectives of that institution. A taxonomy of objectives is provided, distinguishing between output-orientated and input-orientated objectives. This taxonomy is extended and performance criteria are discussed.

Although no central, all-embracing objective is postulated for the Ryerson Polytechnical Institute, an economic efficiency criterion, which is at least not inconsistent with existing goals, is developed. This criterion assumes that resources should be allocated so as to maximize the net expected economic returns from the graduate producing activities at Ryerson.

A survey which has been designed to investigate ex post, the market worth of Ryerson graduates and their perceptions of their status in the labour market, is described. The survey shows clearly, that Ryerson programmes differ in their preparation of graduates for success in the labour market and that graduates' perceptions of their own position in the labour market also differ, by programme.

A linear programming model of the Ryerson Polytechnical Institute is developed, providing a scheme for resource allocation within the Institute, consistent with the economic efficiency criterion.

The linear programming model, both explicitly and implicitly, provides the study with its basic tool for investigating the dimensions of planning for the Ryerson Polytechnical Institute.

At the first level, the linear programming model generates information about Ryerson. It contains mathematical expressions describing the nature of Ryerson's operating structure. It generates a solution vector (X_j^*) which describes an optical enrollment mix and shadow prices (dual values) which provide relative valuations of Ryerson's productive inputs.

Yet, at best, the linear programming model is an imperfect tool for resource allocation. It operates on a one-dimensional objective criterion. Also, its constraints and restrictions assume 'fixed technical coefficients' in production relationships.

However, if planning is to be carried on in any educational institution decision-makers must begin with some output-related structure for decisions and some basis for effective information-gathering. The linear programming model provides such an order and discipline to the planning process.

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SOURCE SHEET FOR SUMMARIES OF STUDIES IN INDUSTRIAL ARTS EDUCATION
JOINT RESEARCH COMMITTEE - ACIATE & NAITTE

Author Zimmers (Last name), Emory (First name), Wilmot (Middle name)

Exact Title A Computer Assisted System for the Generation of Machining Parameters in a Job Shop

Degree granted Ph. D., Date 1973, No. of pages in report 186

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The technical feasibility of a computer assisted system for the generation of accurate machining parameters such as feed, speed and tool geometry was demonstrated in this investigation. The system's structure is dependent on an economic model based on operational characteristics in a machining job shop. The model develops the relationships between costs of collecting, retrieving and analyzing metal cutting data versus benefits of increased machining efficiency. The hierarchical ranking of machining operations on the basis of cutting time is also considered.

Three levels of data base sophistication are proposed. Level One Data are the most complete and are intended for the machining operations which have the highest savings potential. They require a digitized workpiece description when applied. The amount of detail preserved with the Level One Data makes possible analysis on the basis of product quality attributes such as surface finish and size tolerance. They also help to assure that the operator will be able to effect the required metal cutting operation by including tool geometry and tool material. The fact that tool life is preserved makes estimates of tool costs easier to establish.

Level Two Data are used to expand the use of Level One Data. The Level Two Data base contains factors which associate feed, speed and tool life cutting conditions with families of related workpiece materials. The logic used is based on the fact that metallurgically related workpiece materials exhibit similar machining characteristics. For a given plant these groups of related materials can be defined such that good predictive accuracy will result when Level Two factors are applied.

Level Three Data are preserved in a matrix which presents the cutting conditions of feed and speed. Tables are organized on the basis of operation type, workpiece material, machine tool, and primary independent variables such as diameter of a drill. The Level Three Data tables are referenced manually but are dynamic in the sense that data can be readily added to the matrix for a given machine or series of machines.

Extensive use is made of the digital computer. Batch processing of operations on a part is used in conjunction with a tabular output. Nineteen computer programs written in Fortran perform machining cost analysis estimates, match desired feeds and speeds with those available on a given machine tool, analyze machining data on the basis of predetermined logic, prepare machining time summaries, and perform other related tasks.

Description of programming logic development and details of input and output design are presented. The system is designed with sufficient flexibility to permit adaptation to constraints and conditions of a specific job shop. A comparison is made between the proposed system and three other systems to generate machining parameters in a job shop.

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